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THE INDO-AUSTRALIAN SPECIES OF THE *ULTOR*-GROUP OF *APANTELES* FÖRSTER (HYMENOPTERA: BRACONIDAE)

G. E. J. NIXON

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BY

G. E. J. NIXON

Commonwealth Institute of Entomology, London

Pp. 1–34; 29 *Text-figures*

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THE INDO-AUSTRALIAN SPECIES OF THE *ULTOR*-GROUP OF *APANTELES* FÖRSTER (HYMENOPTERA : BRACONIDAE)

By G. E. J. NIXON

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SYNOPSIS

In this paper, the *ultor*-group of *Apanteles* is revised, a new key to the species is given, 22 described species are dealt with, of which 2 are placed in synonymy and 23 new species are described.

The main reason for the writing of this revision was a request by Dr. B. J. Wood of the Chemara Research Station, Johore, Malaysia for the identification of a species of *Apanteles* that he found to be an important parasite of the bag-worm, *Metesa plana* Walker.

Since the species in question is one of several known to be parasites of various lepidopterous pests in the Indo-australian region, I thought it would be much more useful to revise the whole group to which they belong rather than describe a single new species in isolation.

The *ULTOR*-Group of *Apanteles*

I have already defined this group (1965 : 126) but, as usually happens when further species need to be accommodated within a category, modifications now become necessary.

The *ultor*-group is based on three characters; these concern the punctation of the mesoscutum, the shape of the posterolateral field of the propodeum and the general appearance of the vannal lobe of the hind wing. The original definitions and the changes required in them may be stated as follows:

(1) "A sharp, very well defined punctation on the mesoscutum without a trace of longitudinal striation at the posterior end of the imaginary course of the notaulices". This character holds for all the species in this paper with regard to the last remark but I have included two transitional species—*lipsis* and *fakhrulhajiae*—in which the mesoscutal punctation could be described neither as sharp nor well defined.

(2) "A postero-lateral propodeal field that is always distinctly a little transverse". This is true of the majority of the species, but one—*cato*—has this field as long as wide. In others, among them, *platyedrae*, the boundary of this field is obscured by coarse rugosities; and in one species, *tasmanica*, the area is indicated simply by a fading out of sculpture.

(3) "A vannal lobe with an evenly convex edge that is fringed throughout with short hairs". The fringe of hairs remains constant, but in a few species, among them *labaris*, the edge is straight beyond the widest part of the lobe. In this respect there is an approach to the condition found in some species of the *ater*-group (Nixon, 1965 : 25).

I also mentioned that the first tergite is usually parallel-sided; this is essentially true. It is never wedge-shaped, i.e. narrowed behind, as in most of the species of the *ater*-group.

Concerning the species dealt with in this synopsis, the only character that I have found to have real significance in separating them is the shape of the ovipositor as seen in profile.

A few transitional species are included, for it is possible that they might be sought within the *ultor*-group as I have defined it.

KEY TO SPECIES

FEMALES

1 Propodeum with only the merest trace of an areola and without trace of costulae; punctation of mesoscutum fine, dense and, towards front, obsolescent.
Antennal scape and hind femur yellow; stigma with pale, basal spot; gaster, apart from tergite 1 and the basal field of tergite (2 + 3), mainly reddish or reddish yellow; tergite 1 densely rugose; ovipositor sheath a little longer than the hind tibia . . . . **fakhrulhajiae** Mahdihassan (p. 33)

– Propodeum almost always with clearly defined areola and costulae; mesoscutum always with a very well defined, characteristic punctation (but cf. *lipsis*); in species in which the areola and costula are obscured by coarse rugosities, the punctures of the mesoscutum are particularly large and sharply defined with polished interstices (*platyedrae*, *gentilis*) 2

2 Basal field of tergite (2 + 3) very much wider than the apical width of tergite 1 (Text-fig. 22).
Aberrant species with the ocelli in a high triangle, the posterior tangent to the anterior ocellus passing clearly in front of the posterior pair; hind femur reddish yellow; punctation of the mesoscutum fine, obsolescent; ovipositor sheath slightly longer than the hind tibia . . . . . **amaris** sp. n. (p. 32)

– Basal field of tergite (2 + 3) at most slightly wider than the apical width of tergite 1 3

3 Cheeks with a whitish blotch; propodeum without clearly defined areolation.
Ovipositor sheath considerably longer than the hind tibia; ovipositor thin . 4

– Cheeks without a whitish blotch 6

4 Mesoscutum strongly shining, its punctation either fine or the punctures well separated 5

– Mesoscutum dull, showing two, broad bands of coarse, more or less coalescent punctation along the imaginary course of the notaulices.
Hind tibia with apical infuscation that extends ventrally almost to middle **tasmanica** Cameron (p. 17)

5 Apart from a hardly indicated areola, propodeum shiny, smooth-looking and with only vague traces of sculpture; pubescence of middle part of mesoscutum brushed inwards towards the middle line; hind tibia entirely yellow; ocelli in a high triangle, the posterior tangent to the anterior ocellus passing clearly in front of the posterior pair . . . . **lipsis** sp. n. (p. 32)

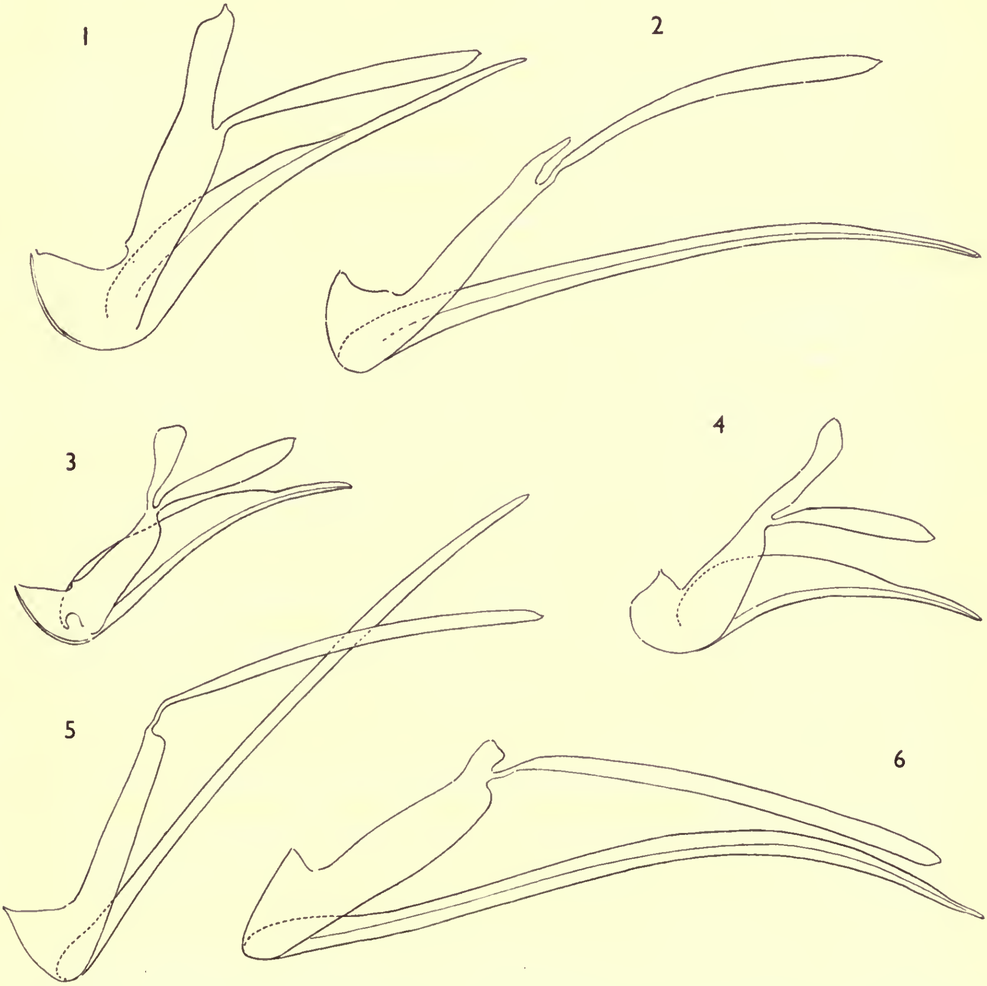
– Propodeum strongly, coarsely rugose almost everywhere but with clearly indicated costulae; pubescence of mesoscutum normal; hind tibia almost black except for a pale, basal ring; posterior tangent to the anterior ocellus virtually touching the posterior pair . . . . **ilione** sp. n. (p. 18)

6 Ovipositor sheath distinctly longer than the hind tibia 7

– Ovipositor sheath not longer than the hind tibia 21

7 Gaster yellow, except tergite 1 which is reddish with narrow, darker lateral margin. Mesoscutum shiny, with large coarse punctures; propodeum rather long, its three posterior fields sharply defined and highly polished; ovipositor rather thick, with down-curved, attenuated tip. . . . . . **numenes** sp. n. (p. 31)

– Gaster dark, except in one species—*vernaliter*—and in this species at least tergite 1 is entirely blackened 8



FIGS. 1–6. *Apanteles*, ♀: Ovipositor of 1, *aso* sp. n.; 2, *parasae* Rohwer; 3, *hyposidrae* Wilkinson; 4, *cleo* sp. n.; 5, *stantoni* Ashmead; 6, *metesae* sp. n.

8 Gaster dusky yellow, except for tergite 1, the basal field of tergite (2 + 3) and a faint band on the following tergites.
Vertex to sides of posterior ocellus with rather coarse punctation
vernaliter Wilkinson (p. 21)

– Gaster entirely dark 9

9 Mesoscutum highly polished, its punctures well separated on posterior half (one to three diameters) and mid-posteriorly tending to disappear altogether.
Areola of propodeum, and sometimes costula, obscured by much rugosity; antenna rather short, somewhat shorter than the body; ovipositor sheath about one and a half times longer than the hind tibia; hind femur dark brown
platyedrae Wilkinson (p. 16)

– Mesoscutum appearing less polished because of closer punctation; where there is an approach to the condition found in *platyedrae* the antenna is longer and the ovipositor sheath much shorter (*gentilis*) 10

10 Costula of propodeum directed downwards in its lateral extension and terminating at posterior extremity of lateral propodeal keel.
Large species, *c.* 3·5 mm. without ovipositor; stigma pale with darker border; hind wing glass-clear, very broad (Text-fig. 7); ovipositor straight, rather thick but abruptly downcurved at apex . . . . . . ***labaris*** sp. n. (p. 19)

— Costula of propodeum either reaching the lateral propodeal keel or ill-defined and obscured by adjacent rugosities 11

11 Stigma colourless, with faintly darker border.
Scape and hind femur entirely dark; ovipositor thin; head less circular from in front than usual (Text-fig. 14) . . . . ***lebene*** sp. n. (p. 20)

— Stigma dark, at most with a pale basal spot 12

12 Tergite 1 polished all over and virtually without sculpture.
Punctures on posterior half of mesoscutum well separated, the interstices very shiny; scape entirely dark; wings distinctly brownish, both median and discoidal cell densely setose; apical attenuation of ovipositor abrupt, equal to about two thirds the length of the hind basitarsus (Text-fig. 21) ***lissos*** sp. n. (p. 21)

— Tergite 1 at most becoming polished and unsculptured towards apex . . . 13

13 Mesoscutum highly shining, its punctures rather large, sharply discrete, absent along middle line but tending in places to be contiguous along the imaginary course of the notaulices
Scape mainly reddish yellow; antenna long, distinctly longer than the body; hind tibia blackened, except for whitish, basal ring; ovipositor weakly but evenly down-curved . . . . ***gentilis*** sp. n. (p. 17)

— Mesoscutum rarely as shiny between its punctures and then either the ovipositor is longer and straight, except at apex (*coequatus*), or the hind tibia is entirely yellow (*cyamon*) 14

14 Scape of antenna entirely dark 15

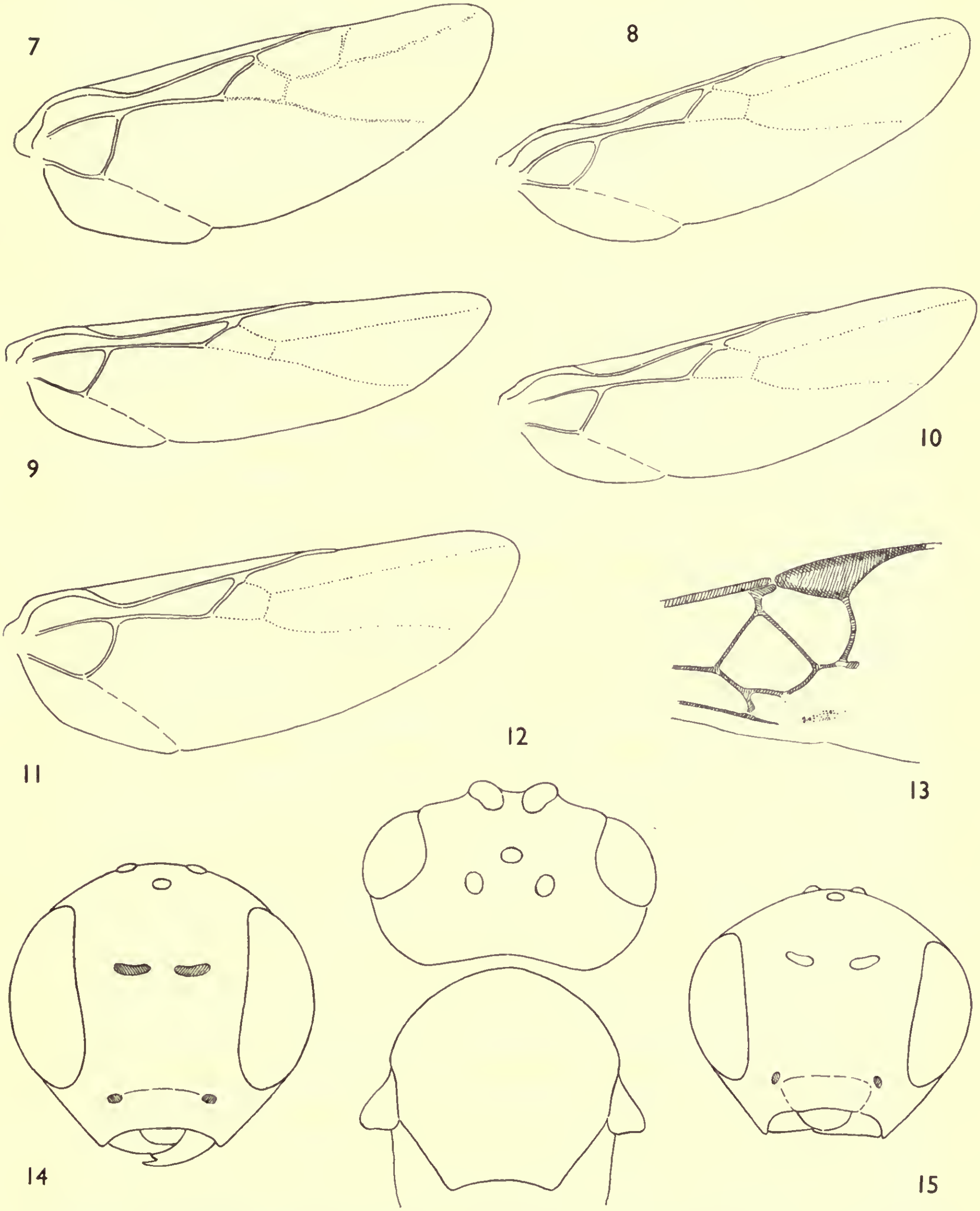
— Scape of antenna yellow, usually with darker, apical rim 19

15 Ovipositor very thick, fully equal to the width of the hind basitarsus, as seen in profile (Text-fig. 6) 16

— Ovipositor much less thick, not equal to the width of the hind basitarsus as seen in profile 17

16 First discoidal cell distinctly wider than high, 7 : 6; ovipositor strongly and deeply curved (Text-fig. 6).
Antenna long, with the preapical segment fully one and a half times longer than wide; hairs of tergite 3 reduced almost to a single row ***metesae*** sp. n. (p. 15)

— First discoidal cell not distinctly wider than high; ovipositor almost straight.
Preapical segment of the antenna only slightly longer than wide . . .
hasorae Wilkinson (p. 14)



FIGS. 7–15. *Apanteles*, ♀: Hind wing of 7, *labaris* sp. n.; 8, *lebene* sp. n.; 9, *platyedrae* Wilkinson; 10, *caniae* Wilkinson; 11, *maro* sp. n.; 12, *lipsis* sp. n., head and mesoscutum (dorsal); 13, *baoris* Wilkinson, part of fore wing; 14, *lebene* sp. n., head (from in front); 15, *cato* sp. n., head (from in front).

17 Hind femur infuscate but with a yellowish flush along each side; mesoscutum polished between its sharp punctures. . . . .
Ovipositor straight, except at apex, a little more than two and a half times longer than the hind tibia; spines of the outer side of the hind tibia dense and almost all of them thick . . . . . . ***coequatus*** sp. n. (p. 20)

— Hind femur dark brown to blackish throughout; mesoscutum lacking a polished appearance 18

18 Front part of the mesopleurum dull, rugose-punctate; setae of the median cell tending to be widely absent along the medius side of the cell; punctation of the mesoscutum contiguous and in places confluent, the surface having a somewhat roughened appearance; areolation of the propodeum very sharply defined, strong . . . . ***iulis*** sp. n. (p. 16)

— Front part of the mesopleurum shiny and with weak punctation; setae of the median cell tending to be evenly distributed; punctation of the mesoscutum, though tending to be contiguous along the imaginary course of the notaulices, sharper, the surface lacking the roughened confluent appearance of *iulis*; areolation of the propodeum much weaker, poorly defined . . ***miris*** sp. n. (p. 14)

19 Hind tibia yellow throughout; mesoscutum strongly shining between its rather small, discrete punctures; wings brownish.
Scape yellow throughout; hind femur entirely yellow; flagellum fulvous, first discoidal cell distinctly wider than high . . . . ***cyamon*** sp. n. (p. 13)

— Hind tibia with at least the apex blackened; mesoscutum dull between its punctures, with an oily lustre; wings glass-clear 20

20 Hind femur with a variable amount of infuscation . ***inquisitor*** Wilkinson (p. 13)

— Hind femur entirely yellow . . . . . . ***stantoni*** Ashmead (p. 12)

21 Tergite (2 + 3) distal to the basal area almost as rugose as the basal area itself and hardly longer than this.
Tergite 1 strongly widened to apex (Text-fig. 27); ovipositor sheath about as long as the hind basitarsus . . . . ***hemitheae*** Wilkinson (p. 31)

— Tergite (2 + 3) distal to the basal area smooth, at most with a dull, satiny sheen and usually considerably longer than the basal area itself; if not, then the ovipositor sheath almost concealed 22

22 Ovipositor sheath not, or only slightly projecting beyond the apex of the gaster, not longer than the hind basitarsus 23

— Ovipositor sheath always at least considerably longer than this and projecting considerably beyond the apex of the gaster 26

23 Apical segment of front tarsus without trace of a spine.
Hind femur yellow; setae of the median cell dark, evenly distributed over entire surface of cell; mesopleurum in front with large area of dull, coarse rugose-punctation . . . . ***cleo*** sp. n. (p. 30)

— Apical segment of front tarsus with at least a fine, but distinct spine (Text-fig. 24) 24

24 Apical attenuation of the ovipositor almost as long as the thickened, basal part and as long as the hind basitarsus (Text-fig. 1); hypopygium of powerful build and heavily sclerotized. . . . .
Antenna long, thin, with the preapical segment about twice as long as wide ***aso*** sp. n. (p. 30)

— Apical attenuation of the ovipositor much shorter than the basal, thickened part and only about half as long as the hind basitarsus 25

25 Hind femur infuscate; stigma without a pale, basal spot; scutellum convex, markedly punctate, especially along sides; spine of the apical segment of the front tarsus inconspicuous (Text-fig. 24); basal field of tergite (2 + 3) about three quarters as long as that part of the segment beyond it ***hyposidrae*** Wilkinson (p. 29)

— Hind femur yellow or almost so; stigma with a pale, basal spot; scutellum very shiny and with much less evident punctation; spine of the apical segment of the front tarsus slightly better developed than in *hyposidrae* **expulsus** Turner (p. 27)

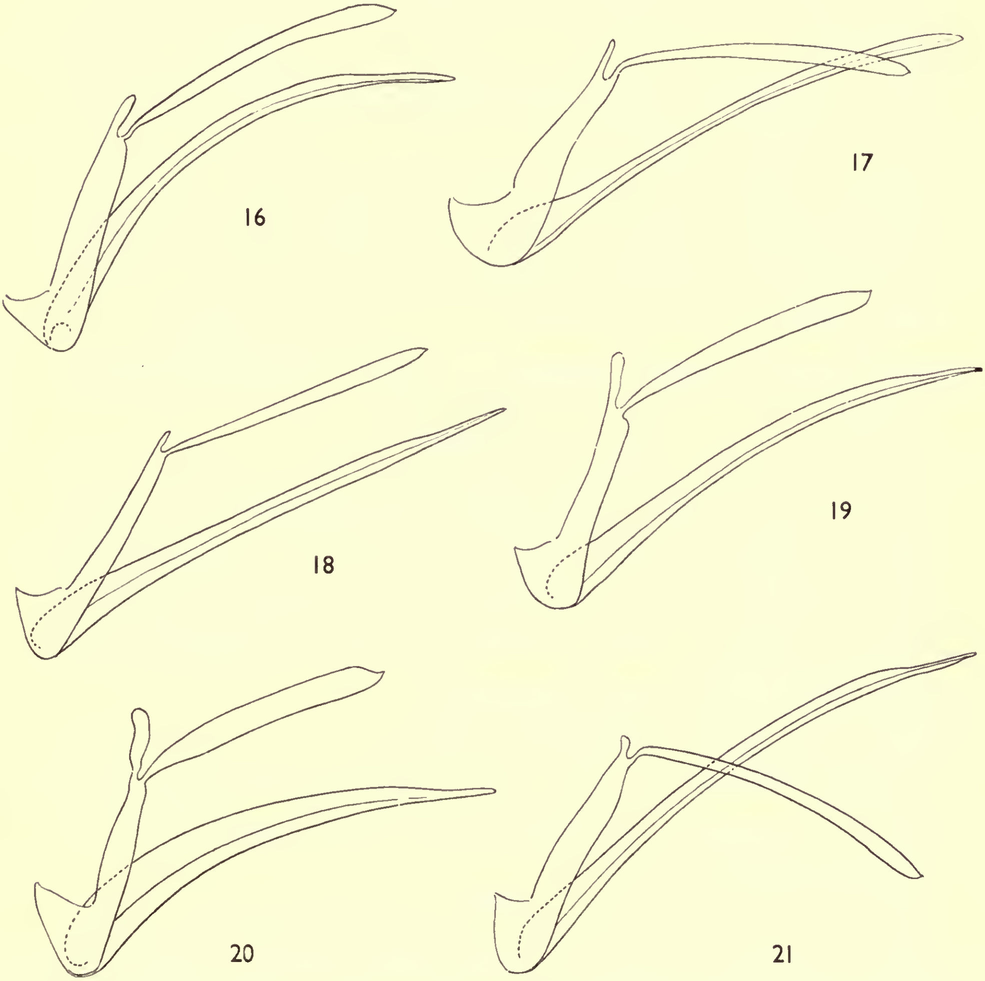
26 Ovipositor sheath much shorter than the hind tibia 27

— Ovipositor sheath at most only slightly shorter than the hind tibia . . . 32

27 Posterior half of the mesoscutum polished and with sparse, discrete punctures, the punctures widely absent along posterior margin and elsewhere separated by at least one diameter.

Hind leg blackish virtually throughout; scutellum polished, impunctate; front tarsus whitish, its apical segment without a spine . . . **acratos** sp. n. (p. 23)

— Posterior half of mesoscutum closely punctate, not polished between its punctures even if these are separated by as much as one diameter 28



FIGS. 16–21. *Apanteles*, ♀: Ovipositor of 16, *baoris* Wilkinson; 17, *caniae* Wilkinson; 18, *cato* sp. n.; 19, *priscus* sp. n.; 20, *prodeniae* Viereck; 21, *lissos* sp. n.

28 Hypopygium short, heavily sclerotized, without lateral creases, though, in the dead insect still tightly folded along the middle line; ovipositor sheath, seen from the side, somewhat fusiform and, seen from above, clothed densely with short, even, not erect hairs.

Hind femur yellow; scape infuscate; stigma with pale, basal spot ***nydia*** sp. n. (p. 29)

— Hypopygium longer, less heavily sclerotized and with clear indication of lateral creases in the dead insect; ovipositor sheath, seen from the side, lacking this fusiform appearance and, seen from above, with longer, more irregular hairs, many of which are more or less erect 29

29 Tergite (2 + 3) showing no differentiated basal area, the basal part of the segment (tergite 2) being completely smooth and separated from the apical part (tergite 3) only by an indistinct suture; its lateral sulci also indistinct and in any case more or less longitudinally placed.

Tergite 1 shiny and virtually smooth; ovipositor more or less straight, very thick, with an abrupt apical attenuation equal to the second segment of the hind tarsus . . . . ***mendosae*** Wilkinson (p. 28)

— Tergite (2 + 3) showing a basal area (tergite 2) that is differentiated from the rest of the segment (tergite 3) either by a well defined suture and limited laterally by sulci or by being simply rugose 30

30 Horizontal surface of tergite 1 in greater part smooth and polished; basal area of tergite (2 + 3) polished and smooth except for traces of sculpture towards sides.

Apical segment of the front tarsus with an inconspicuous (× 40), hardly differentiated spine; basal area of tergite (2 + 3) only about half as long as the rest of the segment beyond it; setae of the median cell colourless; ovipositor very thick, curved, strongly tapering from base to apex but with an apical attenuation equal to the fourth segment of the hind tarsus (Text-fig. 20) ***prodeniae*** Viereck (p. 27)

— Horizontal surface of tergite 1 rugose all over; basal area of tergite (2 + 3) rarely as smooth as this and then it is more than half as long as the rest of the segment beyond it.

Species with the setae of the median cell dark 31

31 Basal area of tergite (2 + 3) strongly, evenly rugose, the sculpture like that of the horizontal part of tergite 1; apical segment of the front tarsus with a strong spine; ovipositor thick, tapering, curved; setae of the median cell longer, sparser, tending to disappear along the medius side of the cell . ***expulsus*** Turner (p. 27)

— Basal area of tergite (2 + 3) with weaker sculpture that tends to fade out medially; apical segment of the front tarsus without a spine; ovipositor thin, almost straight (Text-fig. 17); setae of the median cell shorter, evenly distributed over the surface of the cell . . . . ***caniae*** Wilkinson (p. 26)

32 Ovipositor sheath about as long as the hind tibia 33

— Ovipositor sheath obviously shorter than the hind tibia 40

33 Stigma almost colourless, except along wing edge.

Venation proximal to the areolet unpigmented; first discoidal cell not wider than high . . . . ***acron*** sp. n. (p. 23)

— Stigma somewhat pale only in one species—*baoris*—and this species has the first discoidal cell distinctly wider than high 34

34 Ovipositor straight (Text-fig. 18).

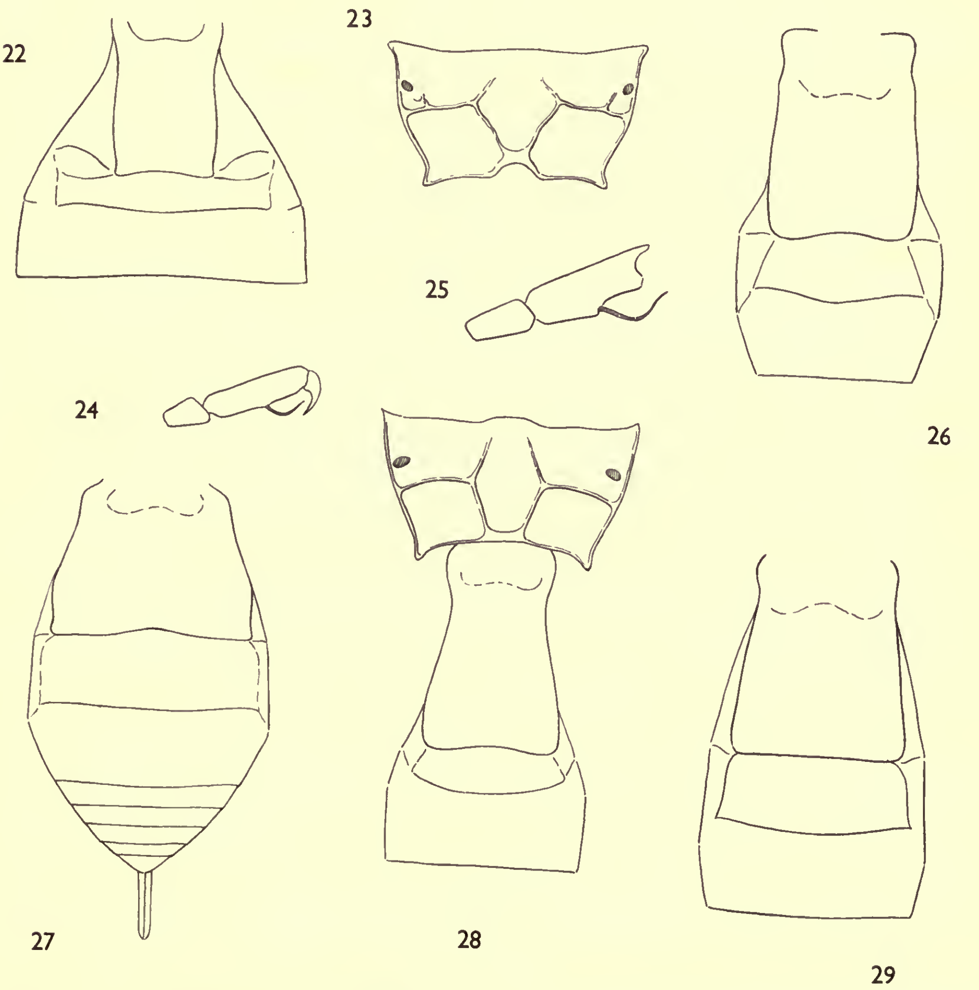
Hind femur blackish; apical segment of the front tarsus without a spine; apical attenuation of the ovipositor as long as the second segment of the hind tarsus; posterior, lateral areas of the propodeum as long as wide; basal area of tergite (2 + 3) virtually smooth . . . . ***cato*** sp. n. (p. 26)

— Ovipositor at most nearly straight and then the hind femur is yellow and the basal area of tergite (2 + 3) is rugose 35

35 Ovipositor weakly curved and with a weakly differentiated apical attenuation that is about equal to the length of the hind basitarsus (Text-fig. 2).
Hind femur infuscate; apical segment of the front tarsus without a spine; setae of the median cell rather sparse and only weakly pigmented **parasae** Rohwer (p. 22)

— If the ovipositor shows an apical attenuation as long as the hind basitarsus, then this attenuation is much more sharply differentiated and the hind femur is yellow 36

36 Ovipositor with an apical attenuation equal to about the length of the hind basitarsus.
Hind femur yellow; horizontal surface of tergite 1 distinctly transverse, coarsely rugose, almost right-angled at its junction with the anterior, declivous



FIGS. 22–29. *Apanteles*, ♀: 22, *amaris* sp. n., basal tergites; 23, *cato* sp. n., propodeum; 24, *hyposidrae* Wilkinson; apical segment of front tarsus; 25, *priscus* sp. n., same; 26, *orelia* sp. n., basal tergites; 27, *hemitheae* Wilkinson, gaster (dorsal); 28, *numenes* sp. n., propodeum and basal tergites; 29, *priscus* sp. n., basal tergites.

surface; the two surfaces almost humped at their junction; apical segment of the front tarsus with a feeble spine; ovipositor almost straight **heterusiae** Wilkinson (p. 25)

— If the ovipositor shows an abrupt apical attenuation, then this is clearly shorter than the hind basitarsus.
Apical segment of the front tarsus without a spine 37

37 Ovipositor thin and without an apical attenuation 38

— Ovipositor thick, strongly down-curved and with an abrupt, apical attenuation.
Hind femur infuscate; apical attenuation of the ovipositor about two thirds as long as the hind basitarsus (Text-fig. 16) 39

38 Ovipositor almost straight; hind femur yellow, except for faint darkening above at apex; first discoidal cell not wider than high.
Basal field of tergite (2 + 3) almost smooth . . . . **aluella** sp. n. (p. 27)

— Ovipositor feebly curved throughout; hind femur infuscate; first discoidal cell slightly wider than high, 25 : 22.
Inner spur of the hind tibia fully half as long as the hind basitarsus; horizontal surface of tergite 1 fully as long as wide . . **bambusae** Wilkinson (p. 24)

39 First discoidal cell wider than high (Text-fig. 13); stigma pale, almost pellucid, with darker border.
Hairs of the median cell dense, evenly distributed . **baoris** Wilkinson (p. 22)

— First discoidal cell not wider than high; stigma evenly dark.
Wings faintly brownish; horizontal surface of tergite 1, at least mid-basally, becoming polished and almost without sculpture . . . **agilis** Ashmead (p. 22)

40 Ovipositor much thickened towards base and with a distinct apical attenuation.
First discoidal cell not wider than high; apical segment of the front tarsus with at least an inconspicuous spine (Text-fig. 25) 41

— Ovipositor at most only weakly thickened towards apex; no apical attenuation present; first discoidal cell distinctly a little wider than high, 25 : 22 . . 42

41 Stigma pellucid; venation proximal to the areolet unpigmented; hind femur blackened; horizontal surface of tergite 1 slightly longer than wide; towards apex, its sculpture becomes very fine, almost longitudinally striate and with a satiny sheen; apical segment of the front tarsus with a small, inconspicuous spine . . . . **maro** sp. n. (p. 25)

— Stigma not pellucid; venation proximal to the areolet pigmented; hind femur yellow; horizontal surface of tergite 1 slightly transverse, with coarse striation towards apical corners; apical segment of the front tarsus with long, curved, very conspicuous spine . . . . **priscus** sp. n. (p. 24)

42 Apical segment of the front tarsus with a distinct spine (Text-fig. 26); horizontal surface of tergite 1 very slightly transverse and very coarsely rugose. . .
Punctures of the dorsal surface of the mesoscutum large, of even size and well separated; ovipositor thickened towards base . . . . **orelia** sp. n. (p. 28)

— Apical segment of the front tarsus without a spine; horizontal surface of tergite 1 slightly longer than wide, its sculpture finer and, towards apex, becoming fine striation; ovipositor thin, feebly curved . . **bambusae** Wilkinson (p. 24)

DESCRIPTIONS OF SPECIES

Apanteles stantoni (Ashmead)

(Text-fig. 5)

Urogaster stantoni Ashmead, 1904 : 20.
Apanteles stantoni (Ashmead) Wilkinson, 1928 : 131.
Apanteles fistulae Wilkinson, 1928 : 134. **Syn. n.**

♀. Hind femur yellow. Wings hyaline; venation proximal to the areolet almost colourless.

Areolation of propodeum on the whole sharp, distinct; the three posterior fields polished and more or less smooth.

Horizontal part of tergite 1 varying from slightly transverse to fully as long as wide; rarely a little widened towards apex; often becoming markedly smoother towards apex. Basal field of tergite (2 + 3) with only weak traces of sculpture, about half as long as the rest of the segment beyond it; in the two females of the type series of *fistulae*, tergite 1 is sculptured right to apex, the apical corners of the segment showing the striation common to many related species. Ovipositor sheath about one and one third times longer than the hind tibia (Text-fig. 5).

Length: *c.* 2·5 mm. without ovipositor.

CHINA. FIJI. INDIA (type locality of *fistulae*). MALAYSIA. PHILIPPINES: Manila (type locality of *stantoni*).

Host. None known for type series of *stantoni*. Series in B.M. bred from the Pyralids: *Glyphodis laticostalis* Guenée, *Margaronia glauculalis* Guenée and *Margaronia marginata* Hampson. *Argyroploce codonectis* Meyrick (Eucosmidae). *Sylepta derogata* Fab. (Pyraustidae).

Wilkinson (1928 : 132) recorded *stantoni* as a solitary parasite but this was in error, I think. There are two batches of cocoons in the B.M., one from China (without host name) and the other from Malaysia (ex *Sylepta derogata* on *Hibiscus*).

My interpretation of *stantoni*, like Wilkinson's, is based on a paratype in the British Museum.

The legs of *fistulae* are as bright yellow as those of *stantoni* but the ovipositor sheaths are slightly longer. For this reason, these specimens of *fistulae* are intermediate between typical *stantoni* and *inquisitor*. Wilkinson records *fistulae* as having been bred from a Pyralid defoliating *Cassia fistula*.

Apanteles inquisitor Wilkinson

Apanteles inquisitor Wilkinson, 1928 : 134.

This species seems to be a fairly common parasite of *Lamprosema diemenalis* in S.E. Asia. Whether it is really distinct from *stantoni* I cannot be sure.

♀. The hind femur is obscurely yellowish compared with that of *stantoni*, distinctly darkened towards base and often along upper surface; sometimes the entire femur is lightly infuscate.

Ovipositor sheath distinctly longer than that of *stantoni*, one and a half times longer than the hind tibia.

CHINA. FIJI. MALAYSIA.

Type in the British Museum (Nat. Hist.).

Host. *Lamprosema diemenalis* Guérin (Pyraustidae); *Maruca testulalis* Geyer (Pyraustidae). A gregarious parasite.

Apart from the slight difference in the colour of the legs and a constantly longer ovipositor sheath, I have been unable to confirm any of the differences, given by Wilkinson, between this species and *stantoni*. The *stantoni*-complex, consisting as it does, of *stantoni*, *inquisitor* and *fistulae* is in much need of further study.

Apanteles cyamon **sp. n.**

In length of ovipositor and yellow scape, a species fairly close to *stantoni*, with which it may be compared as follows:

♀. Hind tibia entirely yellow; hind tarsus almost as pale; only first two segments darkened along outer side. Scape bright yellow, without a darkened, apical rim; flagellum brownish fulvous. Underside of thorax brownish. Wings faintly brownish, the venation proximal to the areolet pigmented and the setae dark.

Antenna rather short, a little thicker than in *stantoni*, the preapical segment hardly longer than wide.

Mesoscutum highly polished between its punctures, the punctures more sharply defined and more discrete than in *stantoni*. Setae of the first discoidal and median cells denser, shorter than in *stantoni*. Spines of the outer side of the hind tibia thicker, more numerous.

Tergite 1 sculptured right to apex. Ovipositor evenly curved as in *stantoni* but slightly thinner. Ovipositor sheath slightly longer.

Length: *c.* 2·5 mm. without ovipositor.

Type ♀. NEW HEBRIDES: 1935 (*M. Risbec*), ex *Batrachedra* sp.

Type in the British Museum (Nat. Hist.).

Host. *Batrachedra* sp.

This species is characterized by the shiny mesoscutum, and entirely pale scape and hind tibia. I am a little puzzled by the pale flagellum. If this is really a feature of the species and not the result of accident, it provides a colour character of considerable use in the recognition of the species.

Apanteles miris sp. n.

♀. Differs mainly from *stantoni* in having a black scape and the hind femur deeply infuscate. The hind tibia is also infuscate but becomes dull reddish on about basal third. Wings very faintly tinted; venation proximal to the areolet pigmented and the setae of the median cell dark.

Thorax, seen from the side, slightly less deep. Areolation of propodeum less well defined; costula very poorly defined, situated distinctly a little posterior to middle. First discoidal cell more densely setose; hind wing a little narrower.

Tergite 1 rugose right to apex. Basal field of tergite (2 + 3) as rugose as the apical part of tergite 1. Ovipositor sheath very slightly longer.

Length: *c.* 2·5 mm. without ovipositor.

Type ♀. AUSTRALIA: F.C.T., Molonglo R., 8.v.1930 (*L. F. Graham*) B.M. (Nat. Hist.).

Paratypes. AUSTRALIA: same data, 10.iv.1930, 1 ♀; F.C.T., Blundell's, 15.iii.1930, 1 ♀ (both *L. F. Graham*).

On the whole, this is a poorly characterized species, clearly close to the *stantoni-inquisitor* complex and differing from it only by a very subtle combination of features, within which a general deepening of colour plays an important part. The dull, strongly rugose basal field of tergite (2 + 3) is probably diagnostic.

Apanteles hasorae Wilkinson

Apanteles hasorae Wilkinson, 1928 : 133.

This species and the next—*metesae*—are mainly characterized by the greatly thickened ovipositor.

♀. In the type series, discoloured and shrivelled through having been initially preserved in fluid, the scape is entirely infuscate. Hind femur infuscate throughout; hind tibia weakly infuscate but paler towards base.

Antenna a little shorter than the body, with the three preapical segments very slightly longer than wide. Side of face distinctly, closely punctate.

Scutellum flat, polished, impunctate.

Horizontal part of tergite I about as long as wide, smooth and polished over most of its surface; this may be merely a feature of the single series available. Ovipositor with an abrupt, apical attenuation equal to about the length of the second segment of the hind tarsus.

JAVA.

Type in the British Museum (Nat. Hist.).

Host. *Hasora mixta* Mabille (Hesperiidae) on Derris.

Apart from the colour of the scape and the legs, and the much thicker ovipositor, there is virtually nothing to separate this species from *stantoni*. Certainly, the face of *stantoni* appears much less closely and distinctly punctate but it must be remembered that only one series of *hasorae* has been available for comparison.

Apanteles metesae sp. n.

(Text-fig. 6)

♀. A very dark-legged species with the hind femur almost black; at least the apical half of the hind tibia and whole of the hind tarsus deeply infuscate. Scape blackish. Wings almost hyaline; venation proximal to the areolet faintly pigmented; setae of the median cell dark.

Face with the usual satiny sheen and with weak, obsolescent punctation more like that of *stantoni* than of *hasorae*. Antenna unusually thin; preapical segment fully one and a half times longer than wide.

Punctation of mesoscutum typical of group, not distinguishable from that of the *stantoni*-complex. Scutellum flat, with scattered punctures that become closer towards sides. Spiracle of propodeum separated from junction of costula and lateral propodeal keel by three times its own diameter; in *hasorae*, this distance is distinctly less; in the *stantoni*-complex, it is much less, hardly twice the diameter of the spiracle.

Horizontal part of tergite I varying from slightly transverse to being as long as wide; towards apex, the coarse rugosity of the basal part of this area gives way to delicate longitudinal striation on a smooth surface with a satiny sheen; sometimes the apical part of the tergite is as smooth and polished as in many examples of the *stantoni*-complex. Basal field of tergite (2 + 3) virtually smooth, about two thirds as long as the rest of the segment. Ovipositor (Text-fig. 6).

Length: *c.* 2·5 mm. without ovipositor.

Type ♀. MALAYSIA: Johore, 1963, ex *Metesa plana* (*B. J. Wood*) B.M. (Nat. Hist.).

Paratypes. Same data, II. MALAYSIA: Selangor, Highland Estate, 4 ♀, ex *Crematopsyche pendula*, 22.xii.1960; Perak, Ulu Bernam Estate, 3 ♀, ex *C. pendula*, 22.x.1954 (*I. J. Wyatt*); 2 ♀, ex *C. pendula*, 15.ii.1955 (*Dept. Agriculture*). VIETNAM: Saigon, 2 ♀, ex *C. pendula ?*, 1934 (*Inst. Agron. Colon*).

Host. *Crematospyche pendula* Joannis; *Metesa plana* Walker (Psychidae).

In the twenty three examples examined, the scutellum is weakly shining and distinctly punctate at least towards sides; in this respect, there seems to be a constant difference between this species and the closely related *hasorae*.

It is curious that in none of the above series of *metesae* are males present. There are three males in the types series of *hasorae*.

Apanteles iulis sp. n.

A very dark-looking species, closely related to *stantoni* with which it may be compared as follows:

♀. Hind femur blackish; hind tibia becoming dull reddish yellow on about basal quarter. Scape entirely dark. Fore wing proximal to the areolet showing a slightly greater degree of pigmentation.

Punctation of the mesoscutum slightly less even; punctures of posterior part tending to be confluent in places. Front part of the mesopleurum densely rugose-punctate, dull; in *stantoni*, this sculpture is reduced to discrete, sometimes more or less contiguous punctation.

Horizontal part of tergite 1 slightly longer in relation to its apical width than in *stantoni* and sculptured right to apex, evenly rugose.

Length: *c.* 2·5 mm. without ovipositor.

Type ♀. NEW GUINEA: Lae, vii.1957, ex larva on *Ipomea* leaf (*R. W. Paine*) B.M. (Nat. Hist.).

Paratypes (♀). Same data: 3 ♀, 1 ♂.

Host. Unknown. Since both "larva" and "leaf" are singular, this is probably a gregarious parasite.

Although differing strikingly from *stantoni* in colour, this species, nevertheless, resembles it very closely. The possibility cannot be overlooked that *iulis* is perhaps only an extreme colour form of *stantoni*; the sculptural differences, based only on a small series of *iulis*, do not provide wholly satisfactory evidence of specific validity.

In colour, this species is exactly like *gentilis* though I do not doubt that *gentilis* is a good species.

Apanteles platyedrae Wilkinson

(Text-fig. 9)

Apanteles platyedrae Wilkinson, 1928 : 133.

This species is essentially characterized by reduction of sculpture, the punctation of the mesoscutum being sparser than in any other species dealt with in this paper.

♀. Scape entirely dark. Stigma almost black. Hind femur deeply infuscate; hind tibia infuscate but yellowish on about basal quarter; hind tarsus infuscate throughout.

Temples strongly shining, with hardly a trace of punctation. Antenna a little shorter than the body.

Scutellum smooth, highly polished. Setae of the median cell short, dark, widely absent along the medius side of the cell; first discoidal cell distinctly wider than high, 24 : 19; hind wing rather narrow (Text-fig. 9). Spines of the outer side of the hind tibia numerous, nearly all thick and, on proximal half of tibia, almost dense.

Ovipositor sheath almost twice as long as the hind tibia; ovipositor rather thin but still thick enough to show a distinct, though weak, apical attenuation.

Length: 2·5 mm. without ovipositor.

FIJI.

Type in the British Museum (Nat. Hist.).

Host. *Platyedra* (now *Pectinophora*) *gossipiella* Saunders (Gelechiidae); *Decadarchis heterogramma* Meyrick (Lyonetiidae). No information exists to show whether *platyedrae* is a gregarious or solitary parasite.

The head of this species is wider in comparison with the width of the thorax than in the *stantoni*-complex and the thorax, seen from the side, is more elongate and a little flattened.

Apanteles gentilis sp. n.

In darkness of leg colour and reduction of mesoscutal punctation, this species is much like *platyedrae*. It is, however, rather less elongate than that species and, having a pale scape, is perhaps more closely related to the species clustering around *stantoni*.

It may be compared with *platyedrae* as follows:

♀. Hind tibia darker, almost black, with a sharply delimited, whitish yellow, basal band covering about basal fifth. Scape yellow, except for faint darkening around the apical rim.

Temples with slightly more distinct punctation. Antenna considerably longer with segment 15, fully one and a half times longer than wide; in *platyedrae*, this segment is hardly longer than wide.

Punctures of the mesoscutum large, occasionally confluent and, on each side of the middle line on posterior half, virtually contiguous. Propodeum more coarsely rugose, the costula hardly defined as such and the areola very poorly indicated. First discoidal cell less obviously wider than high. Spines of the outer side of the hind tibia slightly less thick and less dense.

As in *platyedrae*, tergite 1 is rugose right to apex but here rather more densely so than in *platyedrae*. Ovipositor sheath as long as the hind tibia; ovipositor thinner and with an apical attenuation; evenly curved.

Length: 2·4 mm. without ovipositor.

Type ♀. New Guinea: Lae, x.1957, ex larva of *Agonoxena pyrogramma* (*R. W. Paine*) B.M. (Nat. Hist.).

Paratypes (♀). Same data, 2 ♀, 2 ♂. New Britain: Rabaul, 7 ♀, 3 ♂, ex *Agonoxena pyrogramma* (*R. W. Paine*). Solomons: Banika Is., 1 ♀, ex *Agonoxena* sp., 2.viii.1963 (*R. W. Paine*).

Host. *Agonoxena pyrogramma* Meyrick (Agonoxenidae). Solitary parasite, making a very thin, white cocoon.

This species is largely characterized by the combination of colour of the hind legs and coarsely rugose propodeum. It should be mentioned that the definition of the costula of the propodeum is variable; it is more obscure in the type series from N. Guinea than in the longer series from New Britain.

Agonoxena pyrogramma is also parasitized by *Apanteles pyrogrammae* Nixon (1965) and *A. painei* Nixon (1965), both of which are very different from *gentilis*.

Apanteles tasmanica Cameron

Apanteles tasmanica Cameron, 1912 : 196.
Apanteles tasmanica Cameron; Wilkinson, 1928 : 120.

There are two specimens labelled "tasmanica type" in the B.M., a male and a female. Wilkinson (1928 : 121) expressed a doubt concerning the correct association of these two specimens. Having examined a large series of *tasmanica*, I am satisfied that both male and female belong to this species.

♂ ♀. Cheeks with a conspicuous, whitish, transparent blotch. Tegula bright yellow. Wings hyaline. Hind femur entirely yellow. Basal half of gaster yellowish beneath.

♀. Head between the posterior ocellus and the eye polished, virtually smooth. Antenna about as long as the body, with the preapical segment about one and a quarter times longer than wide.

The two dull, broad bands of densely crowded, large punctures are characteristic of the mesoscutal sculpture. Propodeum with a prevailing sculpture of coarse, rugose-punctation; the posterior, lateral area represented by a small, transverse field that is almost smooth; towards the dorsal areas, the surface becomes smoother, more shiny and with isolated punctures; owing to the absence of clearly defined areolation, the area occupied by hairs is considerably greater than in typical species of the *ultor*-group with complete areolation; in such species (typified by the common *stantoni*), the hairs are restricted to the two, lateral, dorsal areas. Setae of the median cell dark, tending to be widely absent along the medius side of the cell; edge of vannal lobe evenly convex.

Ovipositor sheath about one and one third times longer than the hind tibia; ovipositor thin, evenly down-curved.

Length: *c.* 2·8 mm. without ovipositor.

TASMANIA (type locality). NEW ZEALAND: Nelson, long series in the B.M. (Nat. Hist.) bred from *Tortrix postvittana* on Apple.

Type in the British Museum (Nat. Hist.).

Host. *Tortrix postvittana* Walker (Tortricidae).

The colour of the hind tibia seems to be variable; it is always darkened at base but in some of the New Zealand specimens the infuscation spreads on the under-side of the tibia as far as middle. Sometimes tergite (2 + 3) distal to the basal area shows a yellow mark on each side (type ♀ and some of the New Zealand examples).

Two specimens from Australia vary in the colour of the hind femur; one of them (Queensland, Lockyer, "from Lucerne") has the hind femur infuscate throughout and the hind tibia yellowish only on about basal third but the infuscation more extensive below than above as in typical examples. The second specimen (F.C.T., Brindabella) has the hind femur infuscated mainly along upper surface and is thus intermediate.

The essential character for recognizing *tasmanica* is the sculpture of the mesoscutum.

Apanteles ilione **sp. n.**

This species is closely related to *tasmanica* in general facies, in having a white genal blotch and reduced propodeal areolation. It may be compared with *tasmanica* as follows:

♀. Hind femur infuscate but with a paler flush along each side; hind tibia infuscate but sharply paler on about basal fifth; hind tarsus blackish throughout. Stigma with a pale mark at base, that cuts distally like a wedge into the darker part; venation proximal to the areolet less deeply pigmented.

Head slightly more transverse, even smoother above and with a slightly more evident satiny sheen.

Mesoscutum strongly shining and polished between its sharp punctures; these are slightly more crowded to form, broad, bands along the imaginary course of the notaulices but nowhere are the punctures confluent. Setae of the median cell very sparse as in *tasmanica* but even more widely absent along the medius side of the cell. Propodeum more coarsely rugose, the rugosities occupying the whole of the dorsal areas; costulae distinctly indicated in the single female available. Anterior part of mesopleurum polished, with sharp, discrete punctation.

Gastral setae a little shorter and sparser, those on tergite (2 + 3) distal to basal area reduced almost to a single row. Ovipositor sheath longer, about one and two thirds times longer than the hind tibia.

Type ♀. FIJI: Koronivia, 19.i.1963, ex *Phycita* sp. (*B. A. O'Connor*) B.M. (Nat. Hist.).

Host. *Phycita* sp. Presumably a solitary parasite.

Apanteles labaris sp. n.

(Text-fig. 7)

This is the largest of the species dealt with in the synopsis and is unlike any other on the structure of the propodeum.

♀. Scape entirely blackened. Wings glass-clear; venation proximal to the areolet without pigmentation. Hind femur reddish yellow; in one female, (Viti Levu, *not type*), the hind femur is faintly darkened along the upper edge; hind tarsus deeply infuscate.

Temples shiny, with only a vague trace of punctation. Antenna long with segment 16 fully one and a half times longer than wide.

Mesoscutum shiny but with a faint oily lustre; on anterior half the punctures are fine but along the imaginary notaulic courses, the punctures are larger, contiguous and form dull bands; posterior to middle, the course of the notaulices is lost and the punctures everywhere become larger and more widely spaced than on the front, middle part of the mesoscutum. Scutellum highly polished, flat, with only the merest trace of fine punctation along sides. Propodeum on the whole coarsely rugose; areola ill-defined and filled with rugosities. Setae of the median cell and the first discoidal cell unusually sparse, those of the discoidal cell separated by a distance greater than the length of a seta; hind wing unusually broad (Text-fig. 7); basella of hind wing straight; vannal lobe very slightly convex beyond its widest part. Anterior part of mesopleurum shiny and with discrete punctation.

Horizontal part of tergite 1 slightly transverse, coarsely rugose but with a smoother, more shiny, median area. Basal field of tergite (2 + 3) almost as long as the rest of the tergite beyond it and with a row of punctures along its posterior part; the long, rather sparse hairs of the apical part of tergite (2 + 3) are distributed more or less evenly over its entire surface. Ovipositor sheath fully one and a half times longer than the hind tibia.

Length: *c.* 3·5 mm. without ovipositor.

♂. Like the female but the hind femur entirely infuscate. In one of the two males, (the other has been damaged by a pin), the large, mid-basal area of the mesoscutum is polished and without punctures.

Type ♀. FIJI: Viti Levu, Verata, Tailevu, 17.ix.1954, ex ? *Cryptophlebia pallifimbriana* (*B. A. O'Connor*) B.M. (Nat. Hist.).

Paratypes (♀). Same data, 1 ♀, 2 ♂; FIJI: Suva, 1 ♀, 29.i.1938.
Host. ? *Cryptophlebia pallifimbriana* Bradley (Tortricidae).

An interesting species and rather far removed from such typical species of the *ultor*-group as *stantoni*. Apart from size and propodeal structure, the shortness of the apical part of tergite (2 + 3) in relation to the length of the basal field is a decidedly characteristic feature of the species.

Apanteles coequatus sp. n.

♀. May be compared with *labaris* as follows: wings very faintly darkened; venation proximal to the areolet weakly pigmented; setae of the median cell dark. Hind femur darkened along both upper and under surface but yellowish along sides; hind tibia deeply infuscate except for basal third; examples with entirely dark or entirely pale hind femur are to be expected.

Antenna shorter, segment 16 being only about one and quarter times longer than wide. Punctation of mesoscutum typical of the group but shiny between the punctures; the punctation is closer than that of *platyedrae* but hardly different from that of *gentilis*. Scutellum not so obviously flat and with a more obvious trace of punctation extending inwards from sides. Costula of propodeum hardly emphasized amid the adjacent rugosities but its position typical of the group. Setae of the median and first discoidal cells dense, more or less evenly distributed.

Horizontal part of tergite 1 as long as wide, less strongly rugose, more shiny and virtually indistinguishable from such species as *platyedrae*, *iulis*, *gentilis* and *ilione*. Basal field of tergite (2 + 3) hardly more than half as long as the rest of the tergite beyond it and with a row of large, rather indistinct pits. Ovipositor sheaths a little shorter; ovipositor thinner, straight but abruptly down-curved right at apex.

Length: *c.* 2·4 mm. without ovipositor.

Type ♀. TONGA-SAMOAN group, Niue Island, 28.v.1949 (*B. A. O'Connor*) B.M. (Nat. Hist.).

A. coequatus seems to be one of a small group of species that includes *platyedrae*, *ilione* and *gentilis*, characterized partly by reduced definition of propodeal areolation accompanied by a general increase in propodeal rugosity. The species have the hind tibia mainly deeply infuscated. Their distribution seems to be papuasian.

Apanteles lebene sp. n.

(Text-figs. 8, 14)

Distinct from all the other species in this paper because of a slight, but significant lengthening of the face as seen from in front.

♀. Legs very dark, all the femora infuscate; hind tibia becoming pale on about basal quarter. Stigma pellucid with faintly darker border; venation proximal to the areolet without pigmentation. Gaster mainly dark brown; tergite 1 more or less black.

Head in facial view (Text-fig. 14). Temples with a faint trace of punctation. Antenna thin, not longer than the body, with the preapical segment about one and a quarter times longer than wide.

Mesoscutum with the punctation typical of the group; surface markedly dull, the punctation close and even. Areolation of the propodeum sharply defined but the general surface rather more rugose than in *stantoni*. Wings narrower than in *stantoni*; setae of the median cell evenly distributed, more numerous than in *stantoni*; basella of the hind wing strongly curved (Text-fig. 8). Inner spur of the hind tibia somewhat long for the group.

Horizontal part of tergite 1 slightly transverse, rugose all over; rest of gaster dull, with an oily lustre; basal field of tergite (2 + 3) almost as smooth as the apical part of the tergite; distal part of tergite (2 + 3) with numerous, adpressed hairs over its entire surface. Ovipositor sheath about one and a third times longer than the hind tibia; ovipositor thin, weakly down-curved towards apex.

Length: 2·5 mm. without ovipositor.

Type ♀. INDIA: Pusa, 16.ii.1931, ex *Pectinophora gossipiella* on cotton, B.M. (Nat. Hist.).

Paratypes. Same data, 2 ♀.

Host. *Pectinophora gossipiella* Saunders (Gelechiidae).

The pallid stigma is a useful secondary aid in the recognition of this species.

Apanteles lissos **sp. n.**

(Text-fig. 21)

A small species, characterized essentially by the smoothness of the first tergite, and the shape of the ovipositor (Text-fig. 21).

♀. The main characters have been given in the key; there is little to add.

Scape entirely dark. Stigma somewhat pale and with a still paler, faintly indicated, basal spot. Hind femur weakly infuscate and paler along each side; hind tibia obscurely yellow but darkened at apex.

Antenna thin, weak, not longer than the body. Head above with a satiny sheen; space between the posterior ocellus and the eye-margin with only a very faint trace of punctation. Face on each side with distinct punctation.

Areolation of propodeum very weak; areola not always sharply separated from the postero-lateral fields; all three fields strongly shining and almost smooth. First discoidal cell distinctly a little wider than high, 11 : 10.

Gaster strongly shining, its setae very sparse. Ovipositor sheath very slightly longer than the hind tibia, *c.* 23 : 20.

Length: *c.* 1·8 mm. without ovipositor, a small species.

Type ♀. CHINA: Canton (*W. E. Hoffman*) B.M. (Nat. Hist.).

Paratypes (♀). Same data, 11 ♀, 1 ♂.

Apart from the highly polished first gastral segment, this species is interesting because of the well defined apical attenuation of the ovipositor. Such an attenuation is usually found correlated with a much shorter ovipositor. Where the ovipositor is much longer than the hind tibia, it can be thin and evenly curved as in *stantoni*, curved and much thickened as in *metesae* or straight with curved tip as in *coequatus* but never with a readily obvious apical attenuation.

Apanteles vernaliter Wilkinson

Apanteles vernaliter Wilkinson, 1932*a* : 141; 1932*b*.: 338.

Very distinct among the species with long ovipositor because of the punctation of the temples and the rather brightly coloured gaster.

♀. Scape yellow; flagellum paler towards base. Hind femur entirely yellow; hind tibia yellow throughout in type series but darkened at tip in a single female from the New Hebrides.

Vertex between the posterior ocellus and the eye-margin, and the temples, sharply and very distinctly punctate, dull.

Punctation of the mesoscutum like that of *stantoni* and allied species. Areolation of propodeum sharp, distinct, the three posterior fields shining, almost polished.

Tergite 1 sculptured right to apex; basal field of tergite (2 + 3) almost as rugose as tergite 1. Ovipositor sheath a little longer than the hind tibia; ovipositor evenly curved throughout.

Length: *c.* 2·2 mm., without ovipositor.

JAVA: Buitenzorg (type locality). NEW HEBRIDES: 1 ♀, 1935, ex larva of *Tortrix* on cocoa tree (*Risbec*).

One of the more distinct species, characterized essentially by the punctation of the top of the head. In this synopsis, the only other species with pale-marked gaster is *numenes* but this species has the gaster mainly brilliant yellow. In *vernaliter*, the pale colour is a much less obvious feature.

Apanteles parasae Rohwer

(Text-fig. 2)

Urogaster philippinensis Ashmead, 1904 : 19 (nec *Apanteles philippinensis* Ashmead, 1904 : 19), [Wilkinson, 1932 : 129].
Apanteles parasae Rohwer, 1922 : 129.
Apanteles parasae Rohwer; Wilkinson, 1928 : 129.

This is a poorly characterized species, most easily recognized by the long, but feebly differentiated, apical attenuation of the ovipositor (Text-fig. 2).

In most of the series examined, the hind femur is infuscate but in one (MALAYSIA: Rambau, without host data) it is yellow throughout.

JAVA: Buitenzorg (type locality of *parasae*). PHILIPPINES: Manila (type locality of *philippinensis*). CEYLON.

Type in the U.S. National Museum.

Host. *Setora nitens* Walker (Limacodidae, in Malaysia). Limacodid sp. on *Cinnamomum* (Ceylon). *Parasa lepida* Cramer (Limacodidae, in Malaysia and Ceylon).

Apanteles baoris Wilkinson

(Text-figs. 13, 16)

Apanteles baoris Wilkinson, 1930 : 280.

One of the smaller species, about 1·5 mm. without ovipositor of female.

The stigma tends to be pale but never so strikingly pellucid as in *acron*. Hind femur, apex of hind tibia and whole of hind tarsus infuscate.

Mesoscutum somewhat shiny, its punctation not sharp, and the punctures on posterior half well separated. Wing (Text-fig. 13).

Horizontal surface of tergite 1 polished and almost smooth.

MALAYSIA: Perak Province (type locality). CEYLON. INDIA.

Type in the British Museum (Nat. Hist.).

Host. *Parnara mathias* Moore; *Parnara bada* Moore (Hesperiidae). A gregarious parasite with cocoons forming a narrow elongate mass, covered with rather loose silk.

This species is essentially characterized by the shape of the first discoidal cell in combination with the thick ovipositor and its long, abrupt, apical attenuation (Text-fig. 16).

Apanteles agilis Ashmead

Pseudapanteles agilis Ashmead, 1905 : 969.
Apanteles hidaridis Rohwer, 1922 : 54. [Wilkinson, 1928 : 131].
Apanteles agilis (Ashmead) Wilkinson, 1928 : 130.

Close to *baoris* but larger and differing chiefly in the shape of the first discoidal cell. Mesoscutum more distinctly and more closely punctate than in *baoris*. Spurs of hind tibia longer and of more powerful build. Ovipositor as in *baoris* (cf. Text-fig. 16).

JAVA: Buitenzorg (♀ paratype in B.M.). PHILIPPINES: Manila (type locality of *agilis*). SUMATRA: Padang (type locality of *hidaridis*).

Type in the U.S. National Museum.

Host. *Hidara irava* Moore (Hesperiidae), recorded host of *hidaridis*. No host known for *agilis*.

Apanteles acron sp. n.

♀. Scape entirely dark; flagellum yellowish brown on basal half, darkening towards apex. Wings milky hyaline. Hind femur weakly infuscate; hind tibia and hind tarsus entirely yellow, the tibia with faint, dark spot on inside at apex.

Temples with the faint roughness common to most species of group. Antenna not longer than the body, rather short; preapical segment about one and a third times longer than wide.

Mesoscutum with the punctation typical of the group. Spiracle of the propodeum separated from junction of costula and lateral, propodeal keel by about its longer diameter; the three posterior areas of the propodeum polished, almost smooth. Setae of the median cell colourless.

Horizontal surface of tergite 1 very slightly longer than wide; apical half of this surface with a microsculpture superimposed on faint, longitudinal striation; the apical part of this tergite has thus a satin-like sheen. Basal field of tergite (2 + 3) about two thirds as long as the rest of the segment. Ovipositor more tapered to apex than in *baoris* and with a much less abrupt apical attenuation (cf. Text-fig. 16).

♂. Like the female except for the sexual differences. Horizontal surface of tergite 1 with hardly a trace of raised rugosity towards apex, smooth-looking but with the same satin-like sheen shown by the female.

Length: ♂ ♀, *c.* 2 mm. without ovipositor of female.

Type ♀. THAILAND ("Siam" on label): Bangkok, 1934–35, ex larva of *Sesamia cretica* (*A. Manjikul*) B.M. (Nat. Hist.).

Paratypes. Same data, 2 ♀, 4 ♂.

Host. *Sesamia cretica* Leder (Phalaenidae).

This species is distinctive mainly on account of its pale stigma. *A. baoris* sometimes has the stigma almost as pale but is smaller than *acron*, with the first discoidal cell obviously wider than high and the vannal lobe relatively smaller.

Apanteles acratos sp. n.

♀. Wings distinctly brownish; stigma without a pale, basal spot; setae of the median cell dark. All the femora darkened, but the hind pair darkest; front and middle tarsi whitish.

Head above polished, impunctate, with a faint satin-like sheen. Antenna longer than the body, the preapical segment about one and a half times longer than wide.

Anterior part of the mesopleurum coarsely rugose. Propodeum posteriorly having a somewhat flattened appearance; its spiracle separated from the junction of costula and lateral propodeal keel by about its longer diameter; posterolateral areas with a considerable amount of coarse rugosity. First discoidal cell very slightly wider than high.

Horizontal surface of tergite 1 about as long as wide, strongly rugose all over. Basal area of tergite (2 + 3) evenly rugose-striate and nearly as long as the rest of the segment posterior to it; hairs of the apical part of tergite (2 + 3) sparse and reduced almost to a single row. Hypopygium in profile acutely pointed. Ovipositor thick with a very abrupt, apical attenuation equal to about the second segment of the hind tarsus.

Length: ♀, *c.* 1·6 mm. without ovipositor.

Type ♀. New Guinea: Pater, 2,500 ft., 30.vi.1957, from Zygaenid larva on *Musa* sp. (*R. W. Paine*) B.M. (Nat. Hist.).

Paratypes. Same data, 2 ♀.

Host. Zygaenid sp.

A small species, largely characterized by the blackened hind legs and sculpture of mesoscutum. The reduced punctation of the mesoscutum is reminiscent of what occurs in *platyedrae* and *lissos*.

Apanteles bambusae Wilkinson

Apanteles bambusae Wilkinson, 1928 : 129.

♀. Scape dark throughout. Stigma without a pale, basal spot; setae of the median cell dark. Hind femur infuscate.

Mesoscutum of the two available females (type and paratype) largely obscured by pin but anterior the surface is shiny between the clearly discrete punctures. Hind spurs rather long, the inner one fully half as long as the hind basitarsus. Hind wing rather narrow.

Horizontal surface of tergite 1 fully as long as wide, finely rugose-striate. Basal area of tergite (2 + 3) feebly rugose, slightly more than half as long as the rest of the segment beyond it.

Length: *c*. 2 mm. without ovipositor.

India: Pusa (type locality).

Type in the British Museum (Nat. Hist.).

Host. *Cosmopteryx bambusae* Meyrick (Cosmopterygidae).

Unfortunately I know this species only from the original, partly damaged series, described by Wilkinson. The shape of the ovipositor seems to be its most distinctive feature.

Apanteles priscus sp. n.

(Text-figs. 19, 25, 29)

♀. Scape entirely dark. Wings hyaline; stigma dark brown with at most a faint, basal spot; setae of the median cell almost colourless. Hind femur bright reddish yellow.

Temples shiny but with traces of shallow punctation. Antenna about as long as the body, with the preapical segment about one and a half times longer than wide.

Mesoscutum with the punctation typical of the group. Spiracle of the propodeum separated from junction of costula and lateral propodeal keel by about two to two and a half times its longer diameter. Apical segment of the hind tarsus with a weak indication of a modification similar to that which occurs on the apical segment of the front tarsus (Text-fig. 25) but here the modification takes the form of a straight bristle rather than a curved spine.

Basal area of tergite (2 + 3) almost as long as the rest of the segment beyond it (Text-fig. 29). Ovipositor (Text-fig. 19).

♂. Like the female except for the sexual differences.

Length: ♂ ♀, 2·3 mm. without ovipositor of female.

Type ♀. India: W. Bengal, Kalimpong, 7.ii.1966, ex *Tiracola plagiata* B.M. (Nat. Hist.).

Paratypes. Same data, 8 ♀, 6 ♂. Ceylon: Peradenya, 11 ♀, 4 ♂, 28.vi.1928, ex *Achaea janata* on *Ricinus*. India: Dehra Dun, 2 ♀, 2 ♂, 7.ix.1933, ex *Hypsa alciphron*. Malaysia: Kuala Lumpur, 1 ♀, 1 ♂, 9.iii.1944, ex *Tiracola plagiata*.

Host. *Achaea janata* L. (Phalaenidae). *Hypsa alciphron* (Hypsidae). *Tiracola plagiata* Walker (Phalaenidae). Evidently a solitary parasite, making a white cocoon covered with much loose silk.

The two females from Dehra Dun have the underside of the gaster entirely yellow and a yellowish suffusion towards the sides of tergite (2 + 3) distal to the basal area.

This species is largely characterized by the strongly developed spine on the apical segment of the front tarsus (Text-fig. 25) and the position of the propodeal spiracle. This last character is not always easy to verify because the two relevant keels are sometimes ill defined at their junction and obscured here by additional rugosities.

Apanteles heterusiae Wilkinson

Apanteles heterusiae Wilkinson, 1928 : 127.

This species is very much like *priscus*, differing from it most obviously in having a longer and virtually straight ovipositor.

♀. Wings faintly brownish; setae of the median cell darker than in *priscus*.

Antenna slightly shorter than in *priscus*, with the preapical segment one and one third times longer than wide.

Spiracle of propodeum separated from junction of costula and lateral, propodeal keel by about one and a half times its longer diameter. Hind wing rather narrow, very slightly wider than in *platyedrae* (cf. Text-fig. 9) but narrower than in *maro* (cf. Text-fig. 11).

Basal field of tergite (2 + 3) relatively shorter than in *priscus* but slightly smaller in proportion to the total area of tergite (2 + 3). Ovipositor sheath hardly shorter than the hind tibia.

CEYLON: Madulsima (type locality). Two further series in the British Museum from Ceylon (Talawakele and Passara) both bred from host of type series—*Heterusia cingala*.

Type in the British Museum (Nat. Hist.).

Host. *Heterusia cingala* Moore (Zygaenidae).

The long apical attenuation of the ovipositor is a very characteristic feature of this species and alone will serve to distinguish it from *priscus*.

Apanteles maro **sp. n.**

(Text-fig. 11)

♂ ♀. The main differences between this species and *priscus* have been given in the key; there is little to add.

Pale parts of the legs much paler than in *priscus*.

Hind wing relatively as broad as in *priscus* (Text-fig. 11); edge of vannal lobe beyond its widest part almost straight; in *priscus* it shows normal convexity but the difference is extremely slight. Spiracle of propodeum separated from junction of costula and lateral propodeal keel by about its longer diameter.

Length: ♂ ♀, 2·3 mm. without ovipositor of female.

Type ♀. INDIA: W. Bengal, Chinsurah, 1950, "on *Diacrisia obliqua*", (*Jute Agricultural Research Institute*) B.M. (Nat. Hist.).

Paratypes. Same data, 3 ♀, 1 ♂.

Host. Presumably *Diacrisia obliqua* Walker (Arctiidae).

Distinctive on account of pale stigma, a rare feature of the *ultor*-group.

Apanteles cato sp. n.

(Text-figs. 15, 18, 23)

♀. A very dark-looking species. Scape entirely black. Wings faintly brownish; venation fully pigmented; setae of the median cell dark. Hind leg blackened, except that the hind tibia becomes paler on proximal half (obscurely yellowish).

In a facial view of the head, the cheeks are less rounded than is usual in the group (Text-fig. 15). Ocelli close together; a lateral ocellus separated from the median ocellus by hardly more than half its own diameter. Antenna fully as long as the body; preapical segment about one and a half times longer than wide.

Punctures of the mesoscutum large, almost contiguous along the broad, imaginary notaulic courses. Scutellum rather coarsely rugose-punctate, especially along sides. Discoidal cell of fore wing slightly wider than high, 8 : 7; hind wing narrow, as in *caniae* (cf. Text-fig. 10) but the basella more obliquely placed than in that species; setae of median cell decidedly long.

Basal field of tergite (2 + 3) almost as long as the rest of the segment beyond it and, being almost as smooth, hardly discrete; apical part of segment highly polished, its hairs very sparse and restricted more or less to a single row. Ovipositor (Text-fig. 18).

♂. Like the female except for the sexual differences; wings slightly less dark.

Length: ♂ ♀, *c.* 2·2 mm. without ovipositor of female.

Type ♀. MALAYSIA: Johore, B.M. (Nat. Hist.).

Paratypes. Same data: 14 ♀, 5 ♂.

Somewhat aberrant on account of the non-transverse posterolateral fields of the propodeum (Text-fig. 23) and very distinct on combination of this and shape of ovipositor but cf. *mendosae*.

Apanteles caniae Wilkinson

(Text-figs. 10, 17)

Apanteles caniae Wilkinson, 1928 : 126.

A pale-legged species; hind femur yellow; hind tibia usually yellow except for faint apical infuscation; rarely this infuscation extending to middle (one series in B.M. from Sumatra). Scape yellowish, with darker, apical rim. Wings distinctly brownish; stigma usually evenly brown but sometimes paler with darker border.

♀. Antenna a little longer than the body; preapical segment fully one and a half times longer than wide. First discoidal cell very slightly wider than high, 11 : 10; hind wing decidedly narrow (Text-fig. 10). The thin, rather short ovipositor is feebly down-curved (Text-fig. 17).

Length: ♂ ♀, *c.* 1·8 mm. without ovipositor of female—a rather small species.

MALAYSIA: Java (type locality). CEYLON. INDIA. N. CELEBES. CHINA. THAILAND.

Type in the British Museum (Nat. Hist.).

Host. *Cania bilinea* Walker (Limacodidae). *Thosea cervina* Moore; *Thosea recta* Hampson (Limacodidae). A gregarious parasite, spinning a tight mass of cocoons beneath the slug-like body of its host.

The short, thin ovipositor is the most important feature of this otherwise poorly characterized species.

Apanteles expulsus Turner

Apanteles expulsus Turner, 1918 : 346.
Apanteles expulsus Turner; Wilkinson, 1928 : 125.
Apanteles mendanae Wilkinson, 1928 : 126. **Syn. n.**

The main differences between this species and *caniae* have been given in the key. The most important of them are the presence of a strong spine on the apical segment of the front tarsus of *expulsus* and the strikingly different ovipositor of this species.

♀. Wings virtually hyaline. Sculpture of posterior part of mesoscutum subtly distinctive, the surface between the punctures being slightly roughened. Hind wing as in *caniae* (cf. Text-fig. 10). All five panels of the propodeum tend to be highly polished and unsculptured.

Length: ♂ ♀, 2 mm. without ovipositor of female.

FIJI (type locality of *expulsus*): several further series in the British Museum. SAMOAN IS.: one series in the British Museum. MARQUESAS IS. (type locality of *mendanae*).

Type in the British Museum (Nat. Hist.).

Host. *Anticarsia irrorata* Fab. (host of type series) (Phalaenidae). *Cosmophila* (now *Anomis*) *flava* Fab. (Phalaenidae). No host known for type series of *mendanae*.

This small species is fairly easily recognized on the combination of the well developed spine on the front tarsus and the strongly rugose basal area of tergite (2 + 3).

Apanteles prodeniae Viereck

(Text-fig. 20)

Apanteles (*Apanteles*) *prodeniae* Viereck, 1912 : 139.
Apanteles prodeniae Viereck; Wilkinson, 1928 : 127.

♀. Hind femur yellow. Antenna rather short, not longer than the body; preapical segment about one and one third times longer than wide.

Horizontal surface of tergite 1 fully as long as wide.

INDIA: Mysore, Bangalore (type locality). SIAM.

Type in the U.S. National Museum. A single "cotype" in the British Museum.

Host. *Prodenia litura* Fab. (Phalaenidae). *Euproctis fraterna* Moore (Lymantriidae) (two series from this host in B.M. (Nat. Hist.) from India, Coimbatore).

The spine on the apical segment of the front tarsus is so poorly developed that, in comparison with the spine occurring in *expulsus*, it might be considered as virtually non-existent.

This species is recognizable on the combination of very thick ovipositor (Text-fig. 20) and unsculptured apical surface of tergite 1.

***Apanteles aluella* sp. n.**

♀. Scape more or less evenly brown. Hind femur yellow but with faint infuscation at apex above. Wings markedly brownish. Gaster brown, except for the black first tergite; the other tergites show a faint, darker band.

Temples with obsolescent rugose-punctation. Antenna rather short, shorter than the body, the preapical segment being about one and one third times longer than wide.

Punctation of mesoscutum typical of most of the species, uncharacteristic. Setae of the median cell dense, evenly distributed over the entire surface of the cell. Inner spur of the hind tibia fully half as long as the hind basitarsus; apical segment of the front tarsus without a spine.

Dorsal surface of tergite 1 distinctly transverse, the surface very shiny and its sculpture fading out beyond middle. Basal area of tergite (2 + 3) almost smooth and about two thirds as long as the rest of the segment beyond it.

Length: 2·4 mm. without ovipositor.

Type ♀. INDONESIA: Sumatra, Pematang, Siantar, 16.ix.1932, ex larva of *Belippa lohor* (*R. I. Nel*) B.M. (Nat. Hist.).

Paratypes (♀). Same data, 8 ♀, 1 ♂.

Host. *Belippa* (now *Nemeta*) *lohor* Moore (Limacodidae).

Distinct on account of long, thin ovipositor but close to *caniae*; *caniae* has the ovipositor and its sheaths much shorter than in *aluella*, among other differences.

Apanteles orelia sp. n.

(Text-fig. 26)

♀. Scape blackish. Venation proximal to the areolet weakly pigmented; stigma dark brown throughout; setae of the median cell dark. Hind femur infuscate.

Temples with only weak punctation, but the surface with a distinct satin-like sheen. Antenna about as long as the body, with segment 16 about one and one third times longer than wide.

Punctation of the mesoscutum characteristic in that the punctures are large and evenly spaced, and, on the disc at least, are separated by about half a diameter. Areolation of the propodeum very strongly defined in two of the four females (including type), with the three posterior fields polished and almost excavate; in the other two females, the areola is filled with coarse rugae. Setae of the median cell rather long, sparse and widely absent along the medius side of the cell.

Gaster (Text-fig. 26). Basal area of tergite (2 + 3) almost as strongly rugose as tergite 1. Ovipositor slightly but evenly thickened towards base; without trace of an apical attenuation at a magnification of (× 40).

Length: *c.* 2·5 mm. without ovipositor.

Type ♀. FIJI: Viti Levu, Naduruloulou, 6.vi.1962, ex ? *Agonoxena argaula* (*B. A. O'Connor*) B.M. (Nat. Hist.).

Paratypes. Same data, 3 ♀.

Host. Probably *Agonoxena argaula* Meyrick (Agonoxenidae). A single cocoon spun in a fold of a leaf-fragment suggests a solitary parasite.

In general facies much like *expulsus* but differing from that species in the sculpture of the mesoscutum and the shape and length of the ovipositor.

Apanteles mendosae Wilkinson

Apanteles mendosae Wilkinson, 1929 : 113.

Scape yellow except for darkened, apical rim. Hind femur yellow.

The anterior brow of the mesoscutum shows on each side of the middle line an elongate, more shiny, less closely punctate area. First discoidal cell distinctly wider than high, 14 : 11; setae of the median cell long, rather sparse. Apical segment of the front tarsus without a spine.

The smooth, almost unsculptured first tergite is distinctly widened towards apex.

Length: *c.* 2·5 mm. without ovipositor.

MALAYSIA: Kuala Lumpur (type locality).

Type in the British Museum (Nat. Hist.).
Host. *Dasychira mendosa* Hübner (Lymantriidae).

Rather easily recognized by the absence of a differentiated basal field on tergite (2 + 3) and the straight ovipositor. A similar ovipositor occurs in *cato* but in this species, the posterolateral field of the propodeum is not transverse.

The sculpture of the anterior part of the mesoscutum is subtly distinctive but in no sense striking.

Apanteles nydia sp. n.

♀. Except for the coxae, the legs are yellow virtually throughout; hind tibia faintly darkened at apex and the hind basitarsus with a dark streak beneath. Wings hyaline, the venation proximal to the areolet colourless.

Antenna a little shorter than the body; preapical segment about one and one third times longer than wide.

Punctation of mesoscutum close but rather shallow over posterior half. Scutellum shining and almost impunctate. Hind spurs short, the inner one not reaching to middle of hind basitarsus. Setae of median cell sparse and widely absent along medius side of cell; hind wing rather broad, as in *maro* (cf. Text-fig. 11).

Horizontal surface of tergite 1 slightly transverse and with a weak, striate sculpture towards sides. Basal field of tergite (2 + 3) fully three quarters as long as the rest of the segment, weakly striate and much narrowed towards sides as in *orelia* (cf. Text-fig. 26). Ovipositor thick, tapering, with an abrupt, apical attenuation that is slightly shorter than the fourth segment of the hind tarsus.

Length: *c.* 3 mm. without ovipositor.

Type ♀. INDIA: Dehra Dun, 17.xi.1934, ex *Selepa celtis* (*S. N. Chatterjee*) B.M. (Nat. Hist.).

Paratypes (♀). Same data, but xi.1934–i.1935, 5 ♀, 2 ♂; also 3 ♀, 2 ♂, labelled as bred from Noctuid larva defoliating unidentified shrub (*S. N. Chatterjee*).

Host. *Selepa celtis* Moore (Phalaenidae), defoliating *Stereospermum suaveolens*.

Recognizable essentially on the heavily sclerotized hypopygium together with the details of the ovipositor and its sheaths.

Apanteles hyposidrae Wilkinson

(Text-figs. 3, 24)

Apanteles hyposidrae Wilkinson, 1928 : 125.

♀. Stigma without a pale, basal spot; setae of the median cell virtually colourless. Hind femur infuscate; hind tibia infuscate but paler on about basal third.

Punctation of mesoscutum dense and somewhat confluent along the broad, imaginary course of the notaulices. First discoidal cell not obviously wider than high, 23 : 22.

Basal field of tergite (2 + 3) smoother than the apical part of tergite 1 and distinctly a little shorter than the rest of the segment distal to it (about three quarters as long). Hypopygium very short, quite inconspicuous, falling far short of the apex of the gaster. Ovipositor (Text-fig. 3).

Length: 2·0–2·2 mm.

JAVA: (type locality, series from *Hyposidra* sp. on *Mimosa*). INDIA: various series from lepidopterous larvae defoliating *Tectona grandis*, Bombay, Madras and

S. Coorg; Dehra Dun, New Forest, series from cocoons found on leaf of Teak (*Tectona grandis*). BURMA: Mandalay, series from lepidopterous larva on *Rosa*. MALAYSIA: Selangor, two series from *Stictoptera cuculloides*. NEW BRITAIN: Keravat, series from *Anomis flava* on Kenah. N. PAPUA: Girua, 2 ♀, from *Tiracola plagiata* (introduced ?). AUSTRALIA: Queensland, series from Noctuid larva on *Urena lobata*. All in the British Museum (Nat. Hist.).

Type in the British Museum (Nat. Hist.).

Host. *Hyposidra* sp. (Geometridae). *Anomis flava* Fab. (Phalaenidae). *Stictoptera cuculloides* Guenée (Noctuidae). A gregarious parasite, but there is, in the British Museum, a single female (W. Bengal, Siligari-Kalimpong Road) bred from solitary cocoon found near hole made by *Hypsipyla robusta* Moore (Phycitidae) on twig of toon (*Cedrela toona*). Although this female has the setae of the median cell darker than in typical *hyposidrae*, I believe it, nevertheless, to be this species.

This species seems to vary considerably in the amount of rugosity shown by the basal tergites of the gaster, series from Malaysia having the basal field of tergite (2 + 3) much more rugose than typical series from India and the type series from Java. The species may be composite as I interpret it but all forms have the short, quite inconspicuous ovipositor shown in Text-fig. 3.

Apanteles cleo sp. n.

(Text-fig. 4)

♀. The differences between this species and *hyposidrae* have been given in the key; there is little to add. The most significant difference is the absence of a spine on the apical segment of the front tarsus and the most easy to recognize is the bright yellow hind femur of *cleo*.

The hypopygium is as poorly developed as in *hyposidrae* but the ovipositor is slightly less curved and the apical attenuation is relatively longer (Text-fig. 4).

Type ♀. INDIA: Assam, Sibsagar dist., xi.1951, ex larva of *Eriboea arja*, B.M. (Nat. Hist.).

Paratype (♀). Same data, 8 ♀, 1 ♂.

Host. *Eriboea arja* Felder (Nymphalidae).

Apanteles aso sp. n.

(Text-fig. 1)

♀. This species is essentially characterized by the long, apical attenuation of the ovipositor (Text-fig. 1).

Scape infuscate. Hind femur infuscate. Setae of the median cell dark.

Basal field of tergite (2 + 3) weakly sculptured or sometimes almost smooth. Apical segment of the front tarsus without a spine. Hypopygium well developed, heavily and evenly sclerotized.

Length: *c.* 2·5 mm.

Type ♀. INDIA: United Provinces, Mussoorie, Vincent Hill, bred 19.viii.1934 from *Lasiocampid* larva, B.M. (Nat. Hist.).

Paratypes (♀). Same data, 8 ♀, 11 ♂.

Host. Lasiocampid sp. Evidently a gregarious parasite.

Readily separated from the other two species with short ovipositor—*hyposidrae* and *cleo*—on the shape of the ovipositor.

Apanteles hemitheae Wilkinson

(Text-fig. 27)

Aapnteles hemitheae Wilkinson, 1928 : 124.

Having almost the whole of tergite (2 + 3) rugose, this is perhaps the most easily recognized of all the species included in this synopsis.

♀. The temples and the vertex immediately behind the ocelli are densely, strongly punctate; the intensity of the punctation is characteristic and also reminiscent of the head punctation of *vernaliter*. Scape and hind femur reddish yellow.

Gaster (Text-fig. 27).

MALAYSIA: Kuala Lumpur (type locality).

Type in the British Museum (Nat. Hist.).

Host. *Hemithea costipunctata* Moore (Geometridae). Presumably a gregarious parasite though the evidence is not conclusive.

Apart from the type-series, comprising two females and three males, I have seen only one other specimen of this species—a single female (Malaysia, Selangor) taken on *Hevea* flower.

***Apanteles numenes* sp. n.**

(Text-fig. 28)

♀. Scape yellow. Hind tarsus infuscate; hind tibia very weakly infuscate at apex; legs otherwise, including all the coxae, bright reddish yellow. Stigma dark brown, with still slightly darker border; venation proximal to the areolet fully pigmented.

Temples with weak, but distinct punctation.

The large punctures of the mesoscutum tend to be contiguous along the broad, imaginary course of the notaulices. Posterolateral areas of propodeum only very weakly transverse. Median cell densely pubescent, the setae not obviously sparser along the medius side of the cell; edge of vannal lobe virtually straight beyond the widest part.

Tergite 1 rather markedly narrowed towards base (Text-fig. 28), rugose all over. Basal field of tergite (2 + 3) polished, more or less smooth.

Length: *c.* 2·4 mm. without ovipositor.

Type ♀. MALAYSIA: Java, Jelawa, 8.viii.1931, "ex caterpillar on *Glochidion* sp." (*L. G. E. Kalshoven*) B.M. (Nat. Hist.).

Paratypes (♀). Same data, 6 ♀, 1 ♂.

Host. Unknown. The number of specimens in the series indicates a gregarious parasite.

A most distinctive species on colour alone. The punctation of the mesoscutum is subtly distinctive and this, in combination with colour and shape of propodeum, isolates the species from all others dealt with in this synopsis.

Apanteles lipsis sp. n.

(Text-fig. 12)

An aberrant species, having perhaps almost as much in common with the *laevigatus*-group (Nixon, 1965 : 181) as with the *ultor*-group. Apart from a striking difference in the type of mesoscutal punctation and the virtually complete absence of propodeal areolation, the species differs from all other in this paper in the form of the ocellar triangle.

♀. Cheeks with a conspicuous whitish blotch. Scape blackish. Front and middle legs entirely yellow; hind femur entirely yellow. Basal third of stigma obscurely yellowish.

Head rather large for the size of the insect, deep from back to front and very slightly wider than the thorax (Text-fig. 12). Face smooth, shiny. Temples smooth, virtually without a trace of punctation; space between the posterior ocellus and eye polished. Antenna broken but the segments discontinuously shorter after the 13th; segment 14 about one and a third times longer than wide.

Mesoscutum strongly shining, its punctation very fine but distinct, tending to fade out posteriorly in the type. Scutellum polished, impunctate. First abscissa of the radius and the transverse cubitus together forming a short vein, the radial abscissa being only slightly longer than the transverse cutibus; first discoidal cell distinctly wider than high, 4 : 3. Propodeum strongly shining, with some vague punctation marking the position of the dorsal areas; the postero-lateral areas indicated merely by a transverse, polished, dorsally unbounded space. Unlike all the other species in this synopsis, the inner spur of the hind tibia is distinctly shorter than the outer one and hardly more than one third as long as the hind basitarsus.

Horizontal part of tergite 1 parallel-sided, slightly transverse, polished (type) to slightly roughened (paratype) and with a few scattered punctures. Basal area of tergite (2 + 3) about one third as long as the rest of the segment beyond and separated from this only by a very fine suture. Ovipositor sheath as long as the hind tibia; ovipositor thin, straight but with and abrupt, downward curve at apex.

Length: *c.* 2 mm. without ovipositor.

Type ♀. S.W. AUSTRALIA: Yallingup, xi.1913, (*R. E. Turner*) B.M. (Nat. Hist.).

Paratype. Same data, 1 ♀.

I associate with this species two males (W. AUSTRALIA: Dongarra, 23.viii.–5.ix.1935, *R. E. Turner*) that I think are the same species. Both show a whitish blotch on the cheek, the same characteristic of mesoscutal pubescence and the same, curiously short, inner spur of the hind tibia. Tergite 1 is slightly narrowed behind, almost smooth; the basal area of tergite (2 + 3) is slightly longer in proportion to the rest of the segment beyond it than in the female.

Apanteles amaris sp. n.

(Text-fig. 22)

This is a highly aberrant species and, on the structure of the tergites, far removed from the other species included in this synopsis.

♀. Scape dark; flagellum brown, the underside still paler. Hind coxa brown, becoming yellowish on apical half; hind femur entirely yellow; hind tibia yellow but with dark tip. Wings faintly brownish; venation proximal to the areolet pigmented; stigma somewhat pale, with faintly darker border.

Face dull, with a pronounced satiny sheen and an excessively fine punctation, just visible at a magnification of (× 40). Vertex with a similar sheen but with slightly more distinct punctation on temples. Antenna thin, slightly longer than the body, with the preapical segment fully one and half times longer than wide and antennal segment 15 fully twice as long as wide.

Mesoscutum with the same dull, satiny sheen as the head; its punctation very fine, but the punctures larger along the broad, imaginary notaulic course. Areolation of the propodeum very ill-defined and obscured by much rugosity; the position of the costula indicates an obviously transverse, posterolateral area; in the type, the areola is virtually not indicated but is more distinct in the second female. Median cell densely, evenly setose all over; first discoidal cell distinctly wider than high.

Tergite 1 parallel-sided, its horizontal surface clearly longer than wide, densely, evenly rugose all over; at the side of this tergite is a large area of conspicuously yellow membrane (Text-fig. 22); rest of gaster densely, very finely pubescent, much more so than in the any of the other species treated in this synopsis. Tergite (2 + 3) faintly dull, with satiny sheen; its basal area slightly less rugose than tergite 1. Ovipositor sheath slightly longer than the hind tibia; ovipositor thin, evenly curved throughout.

Length: *c.* 2·3 mm. without ovipositor.

♂. Like the female but tergite much narrower.

Type ♀. THAILAND ("Siam" on label): Bangkok, 1934–35, ex *Nymphula stagnalis* (*A. Manjikul*) B.M. (Nat. Hist.).

Paratypes. Same data, 2 ♂. THAILAND ("Siam"): 1 ♀, 1 ♂.

Apanteles fakhrulhajiae Mahdihassan

Apanteles fakhrulhajiae Mahdihassan, 1925 : 82.
Apanteles rufulus Wilkinson, 1930 : 154. [Syn. Wilkinson, 1935 : 72].

I include this species because in several respects it is transitional between the *ultor*-group and the *laevigatus*-group (Nixon, 1965 : 181). The apparent absence of propodeal areolation, the relatively fine punctation of the mesoscutum, the pale spot at the base of the stigma and the parallel-sided first tergite are all typical features of the *laevigatus*-group.

Between the feebly indicated arm of the areola and the lateral margin of the propodeum is a much smoother, transverse area, free from hairs, almost polished and undoubtedly corresponding to the postero-lateral area of the typical *ultor*-group. It is mainly on account of this feature that I include *fakhrulhajiae* in this synopsis.

INDIA.

Location of type unknown. Type of *rufulus* in the British Museum.

Host. *Holcocera pulverea* Meyrick (Blastobasidae), on lac.

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A REVISION OF THE ORIENTAL SPECIES OF *PALEXORISTA* TOWNSEND (DIPTERA : TACHINIDAE, STURMIINI)

R. W. CROSSKEY

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Commonwealth Institute of Entomology, London.

Pp. 35–97 ; 79 *Text-figs.*

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A REVISION OF THE ORIENTAL SPECIES OF *PALEXORISTA* TOWNSEND (DIPTERA : TACHINIDAE, STURMIINI)

By R. W. CROSSKEY

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SYNOPSIS

The Oriental species of the genus *Palexorista* Townsend are fully revised, together with their host records. Keys to, and descriptions of, all species are given. Two new species are described, six specific names newly placed in synonymy and eleven lectotypes are designated. The tribe Sturmiini is diagnosed, and a key presented to the Oriental genera. Notes are included on Middle Eastern species of *Palexorista* that are closely allied to Oriental forms.

INTRODUCTION

PALEXORISTA Townsend is one of the commonest genera of Tachinidae in the tropical areas of the Old World, where many species are commonly reared parasites from lepidopterous pests of agricultural crops or timber-trees; some European species are parasites of Diprionid sawfly larvae and have been introduced to, and established in, North America for the biological control of spruce sawflies. Since the work of Mesnil (1949, 1951) the species of *Palexorista* have been placed in the subgenus *Prosturmia* Townsend of the genus *Drino* Robineau-Desvoidy, but it has now been shown (Crosskey, 1966) that *Prosturmia* is a synonym of *Palexorista* Townsend—which is based on a recent type-specimen in copal and not, as originally supposed, in Baltic amber. It is here preferred to treat *Palexorista* in generic status (not as a subgenus of *Drino*) for the reasons put forward in my earlier paper (Crosskey, 1966).

The present revision of the Oriental species of *Palexorista* covers New Guinea and Queensland as well as the Oriental Region proper, but excludes species from the Pacific islands (except for *P. solennis* which is an Oriental species occurring widely in the Pacific islands also). In the past there has been much misidentification of species from this area, and the literature of economic entomology therefore contains many erroneous host records, especially in the period 1932–40: at this time Oriental Tachinidae were identified for the Commonwealth [then Imperial] Institute of Entomology by Baranov, and many of the misidentifications in the literature are traceable to the fact that Baranov confused at least five species under the name *Sturmia inconspicuoides* Baranov. In a later section the existing host records are reviewed with a note of their validity.

The hosts of *Palexorista* species in the Oriental and Australasian regions are largely army-worm and boll-worm larvae of Noctuid moths, and to a lesser extent the larvae of Pyralidae, many of which are major or minor pests of sugar-cane, maize, rice, tapioca, castor-oil plant, tobacco and other agricultural crops, or defoliators of oil-palm and coconut and of forest-timbers (particularly teak). No Hymenopterous hosts of *Palexorista* are known from the area. Baranov (1934*a*) recorded a specimen of *Palexorista* (identified by him as *inconspicuoides*) as " Ex Graeffea cocophaga Newp." in Fiji: I have not seen the specimen referred to by Baranov, but the British Museum collection contains two specimens of *Palexorista*, also from Fiji, reared from *Graeffea crouanii* (Le Guillou) (of which *Graeffea cocophages* (Newport) is a synonym); this is a surprising host record, apparently valid, since *Palexorista* and related genera have not previously been known to parasitize Phasmida or any other orthopteroid orders.

Knowledge of the habits and development of Oriento–Australasian species of *Palexorista* is scanty, but some information has been provided by Cherian and Kylasam (1939) for an Indian species (misidentified as *inconspicuoides*) and by Hoyt (1955) for *Palexorista aequalis* (Malloch) in Samoa.

As a result of the present revision nineteen species of *Palexorista* are recognized in the Oriental Region (including Queensland), of which two are new; twenty-five specific names, other than those of the new species, are involved in the revision and the holotypes or syntypes have been seen on which all but one of these names are based (the holotype of *dilaticornis* Mesnil is apparently lost: see discussion under this species).

It is possible that *Crossocosmia biseriata* Wulp, described by Wulp (1894) from a single specimen from India of doubtful sex, belongs in the genus *Palexorista* but I have been unable to confirm this: Dr. A. P. Kapur informs me that the holotype specimen is in the collection of the Zoological Survey of India in Calcutta, but that it cannot unfortunately be made available on loan because of its very poor condition. The type of *biseriata*, however, shows a single *ad* seta on the mid tibia, four sternopleural setae, some sparse hairs on the parafacials below the frontal setae, and no distinct ocellar setae (Kapur, personal communication), and these characters in combination leave little doubt that *biseriata* belongs in one of the Sturmiine genera of the *Drino*-group: it is impossible to infer sufficient from this and from Wulp's (1894) description and figures for reliable generic assignment.

MATERIAL EXAMINED

Types and other material have been studied from the following collections (abbreviations given are those used throughout the text in the lists of material examined):

Bernice P. Bishop Museum, Honolulu (Bishop Mus.); British Museum (Natural History), London (B.M. Nat. Hist.); Canadian National Collection, Ottawa (Can. Nat. Coll.); Naturwissenschaftlichen Museum der Coburger Landesstiftung, Coburg; Deutsches Entomologisches Institut, Eberswalde (D. Ent. Inst.); Rijksmuseum van Natuurlijke Historie, Leiden (Rijksmus. Leiden); School of Public Health and Tropical Medicine, Sydney (S.P.H.T.M. Sydney); United States National Museum, Washington (U.S. Nat. Mus.); Universitetets Zoologiske Museum, Copenhagen; Zoölogisch Museum, Amsterdam (Zool. Mus. Amsterdam).

TRIBAL DIAGNOSIS OF STURMIINI

At the present time no universally agreed classification exists for the higher Tachinidae (here meaning the Exoristinae plus Goniinae), but the work of Mesnil (1944–65) on the Palaearctic fauna undoubtedly indicates the lines on which a world classification can be evolved and renders order out of the chaos of supposed tribal groups created by Townsend and elaborated in his Manual of Myiology (Townsend, 1934–42). The definition of satisfactory tribes in the vast complex of exoristine-goniine forms is difficult and workable diagnoses will have to be based on aggregates of many characters taken together. The diagnosis here presented for the tribe Sturmiini has been drawn up after study of material from all regions, but there is little doubt that the diagnosis now given may need later modification.

Tribe **STURMIINI** Robineau-Desvoidy

Sturmidae Robineau-Desvoidy, 1863, *Hist. nat. Dipt. Env. Paris* **1** : 885.

Goniine Tachinidae with following combination of characters: Gena wider than profrons or at least subequal in width to profrons. Ocellar setae proclinate (sometimes absent). Upper frons with reclinate orbital setae, female never with outwardly-directed prevertical setae. Vibrissae almost always distinctly above mouth-margin. Parafacials usually bare, sometimes haired but without strong bristles. Arista only thickened basally. Humeral callus with four setae in a basal straight row of three with one set forward (rarely the single forward seta weak and hair-like). 3 + 4 dorsocentral setae. Pre-alar seta long and strong, longer than first posterior dorsocentral or intra-alar seta. Apical scutellar setae present, sometimes weak. First and fifth wing veins always bare. Cell R_5 open. Mid tibia with a ventral submedian seta, sometimes small. Hind tibia with a well developed close-set antero-dorsal fringe, less developed in female. Barette bare or haired anteriorly. Abdominal tergite 1 + 2 excavate to hind margin. Intermediate abdominal tergites almost always without discal setae. Female ovipositor not adapted for piercing. Male hypopygium with two pairs of parameres. Sixth abdominal tergite of male represented at most by two very weak dorsal sclerotizations. Inner margin of lower calypter closely abutting against scutellum.

Key to the Genera of Sturmiini in the Oriental Region

Note: The following genera, placed by Mesnil (1949–52) in the Sturmiini, are here omitted as they do not belong in the tribe as here defined: *Aneogmena* Brauer & Bergenstamm, *Dolichocolon* Brauer & Bergenstamm, *Cadurcia* Villeneuve and *Mycteromyiella* Mesnil. Also omitted are *Tamaromyia* Mesnil (the single species of which occurs in the Oriental Region in Szechwan) and *Koralliomyia* Mesnil (with a single species from India), as both these genera are unknown to me: *Tamaromyia* will probably run in the key to near *Calozenillia*, and *Koralliomyia* differs from all other Oriental sturmiine genera by the obliteration of the interfrontal area.

1 Upper frons with two or three pairs of reclinate orbital setae 2

– Upper frons with one pair of reclinate orbital setae (in ♂ well isolated, in ♀ sometimes preceded by a pair of very small setae ventrad and mesad of main pair) . . 13

2 Eyes densely hairy 3

– Eyes bare or at most very sparsely and inconspicuously short-haired . . . 8

3 Entire parafacials strongly haired. Two or three sternopleural setae, if three as in most females then arranged 1 + 1 + 1 . . . . . ***STURMIOPSIS*** Townsend

– Parafacials bare. Four or three sternopleural setae, if three then arranged 2 + 1 . 4

4 Facial ridges bristled or haired on more than half their length. Ocellar setae usually absent or very weak 5

– Facial ridges bare (*i.e.* with only the usual few setulae immediately above the vibrissae). Ocellar setae strong, subequal in size to upper pair of reclinate orbital setae 7

5 Mid tibia with three or four *ad* setae. Sternopleural setae 2 + 1. Facial ridges visible in profile and armed with very strong setae. Scutellum with strong spiniform discal setae preapically. Interfrontal area much narrower than parafrontal . . . . ***TAKANOMYIA*** Mesnil

– Mid tibia with one submedian *ad* seta. Sternopleural setae 2 + 2. Facial ridges not visible in profile and at least uppermost setulae weak and hair-like. Scutellar hair not at all spiniform. Interfrontal area subequal in width to parafrontal . 6

6 Basal node of R$_{4+5}$ with one long strong curved seta. Facial ridges unusually flat and with long fine hair. Abdomen of ♂ thickly silvery white pollinose on most of T3–T5 . . . . ***ISOCHAETINA*** Mesnil

– Basal node of R$_{4+5}$ with two to four small setulae, occasionally only one but if so small and inconspicuous. Facial ridges not unusually flat, with strong setulae on most of lower half and fine hairs only on upper part. Abdomen of ♂ not thickly and evenly silvery grey pollinose . ***PSEUDOPERICHAETA*** Brauer & Bergenstamm

7 Three sternopleural setae, 2 + 1. Apical scutellar setae strong and crossed but almost horizontal. Second aristal segment not noticeably elongate. Intermediate abdominal tergites usually with small discal setae distinguishable from the hair. Dorsum of thorax yellow pollinose with bold black vittae and black basal half of scutellum sharply demarcated from yellow apical half . ***CALOZENILLIA*** Townsend

– Four sternopleural setae, 2 + 2. Apical scutellar setae strong and directed upwards, crossing usually in apical halves. Second aristal segment conspicuously elongate, three or four times as long as broad. Intermediate abdominal tergites without discal setae. Thoracic pattern normal, not unusually boldly black and yellow ***PARADRINO*** Mesnil

8 Prosternum bare. Facial ridges strongly bristled. Mid tibia with three or four *ad* setae. Three sternopleural setae . . . . . ***BLEPHARELLA*** Macquart

– Prosternum setulose. Facial ridges bare. Mid tibia usually with a single *ad* seta. Four sternopleural setae (except in *Thelairosoma*) 9

9 Three sternopleural setae, 2 + 1. Basal node of R$_{4+5}$ with several small setulae. Fourth abdominal tergite of ♂ without secondary sexual hair-patches ***THELAIROSOMA*** Villeneuve

– Four sternopleural setae, 2 + 2. Basal node of R$_{4+5}$ usually with a single setula (not in *Isosturmia*). Fourth abdominal tergite of ♂ usually with secondary sexual hair-patches or with hair of sides and venter of tergite in some way modified 10

10 Basal node of R$_{4+5}$ with three or four small fine setulae. Vibrissae slightly above mouth-margin in ♂, about level with mouth-margin in ♀. Ocellar setae absent or

minute. Apical scutellar setae directed conspicuously upwards. Venter of fourth abdominal tergite of ♂ with very dense hair-patches of long convergent hair
ISOSTURMIA Townsend

— Basal node of R_{4+5} with one strong setula (very rarely accompanied by a minute supernumerary hair). Vibrissae usually well above mouth-margin in both sexes. Ocellar setae variable. Apical scutellar setae usually more or less horizontal or directed only slightly upwards 11

11 Ocellar setae very strong, subequal in size to reclinate orbital setae, inserted slightly in front of anterior ocellus. Mid tibia with two or one *ad* setae, if with one then hair of venter of fourth abdominal tergite of ♂ unmodified. Parafacials totally bare . . . . ***ZYGOBOTHRIA*** Mik

— Ocellar setae absent or very weak and much smaller than reclinate orbital setae, when present not inserted at all forwards of the anterior ocellus. Mid tibia always with one submedian *ad* seta in Oriental forms (more in European *Drino*). Parafacials bare or finely haired on upper parts 12

12 Parafacials completely bare. Ocellar setae absent. Each side of venter of fourth abdominal tergite of ♂ with unmodified hair or with a large area of short fine close-set hair not formed into a definite fascicle . . ***DRINO*** Robineau-Desvoidy

— Parafacials finely haired on upper parts, hair sometimes extending on to lower parts, occasionally only a very few minute hairs immediately below lowest frontal setae but parafacials never entirely bare. Ocellar setae present, weak and wiry (*P. laetifica* exceptional and ocellar setae absent). Each side of venter of fourth abdominal tergite of ♂ with well defined hair-patch, usually large and dense with hairs very long and converging into distinct fascicle . . ***PALEXORISTA*** Townsend

13 Scutellum with two or three pairs of preapical setae
TRIXOMORPHA Brauer & Bergenstamm

— Scutellum with the normal single pair of preapical setae 14

14 Eyes densely hairy 15

— Eyes bare 16

15 Facial ridges strongly bristled up most of their length . ***PALES*** Robineau-Desvoidy

— Facial ridges bare except for the usual few setulae immediately above vibrissae
SISYROPA Brauer & Bergenstamm [part]

16 Subapical scutellar setae exceptionally widely separated, distance between their bases much greater than that between subapical seta and basal seta of same side of scutellum. Apical scutellar setae very strong, as large as or almost as large as lateral scutellar setae. Four sternopleural setae. Parafacials totally bare. Sides of fourth abdominal tergite of ♂ with long dense hair
STURMIA Robineau-Desvoidy

— Subapical scutellar setae not exceptionally widely separated, distance between bases at most only slightly exceeding and usually less than distance between subapical seta and basal seta. Apical scutellar setae usually much weaker than lateral setae. Three or four sternopleural setae, if ♂ with four then fourth abdominal tergite without dense hair laterally. Parafacials usually with at least a few hairs immediately below lowest frontal setae. Sides of fourth abdominal tergite of ♂ with or without dense hair 17

17 Sides of fourth abdominal tergite of ♂ with long dense hair which extends on to venter. Two or three sternopleural setae, ♀ occasionally with four. Vibrissae well above mouth-margin. Parafacial usually conspicuously haired immediately below frontal setae. Large forms, length 10–20 mm. . . ***BLEPHARIPA*** Rondani

Sides and venter of fourth abdominal tergite of ♂ without long dense hair. Usually four sternopleural setae in both sexes. Vibrissae only a little above mouth-margin. Parafacial almost bare, at most only a very few inconspicuous hairs immediately below frontal setae. Smaller forms, length 5–10 mm.
SISYROPA Brauer & Bergenstamm [part]

SYNONYMY AND DIAGNOSIS OF *PALEXORISTA* TOWNSEND

Genus ***PALEXORISTA*** Townsend, 1921

Palexorista Townsend, 1921 : 134. Type-species: *Tachina succini* Giebel, 1862 [=*Masicera solennis* Walker, 1859], by original designation.

Sumatrodoria Townsend, 1927 : 64. Type-species: *Sumatrodoria summaria* Townsend, 1927, by original designation. (Synonymy by Crosskey, 1966 : 134)

Prosturmia Townsend, 1927 : 69. Type-species: *Prosturmia profana* Townsend, 1927 [=*Masicera solennis* Walker, 1859], by original designation. (Synonymy by Crosskey, 1966 : 134)

Genus of Sturmiini with combination of following characters: Eyes bare. Facial ridges bare. Interfrontal area well developed. Two pairs of reclinate orbital setae. Ocellar setae weak and wiry, much smaller than reclinate orbital setae, very rarely absent altogether. Parafacials finely haired on upper parts, at least near lowest frontal setae, sometimes sparsely haired on whole length. ♂ without proclinate orbital setae. Vibrissae well above mouth-margin (rare exceptions). Basal aristal segments not elongate, second aristal segment not exceeding twice as long as broad. Four sternopleural setae arranged 2 + 2. Two pairs of lateral scutellar setae. One pair of preapical scutellar setae. Apical scutellar setae not directed strongly upwards. Basal node of R_{4+5} with one strong setula (very rarely an additional supernumerary hair). Mid tibia with one submedian *ad* seta in most forms. Intermediate abdominal segments without discal setae. Venter of fourth abdominal tergite of ♂ on each side with secondary sexual hair-patch of long dense hair, usually forming a large tight fascicle.

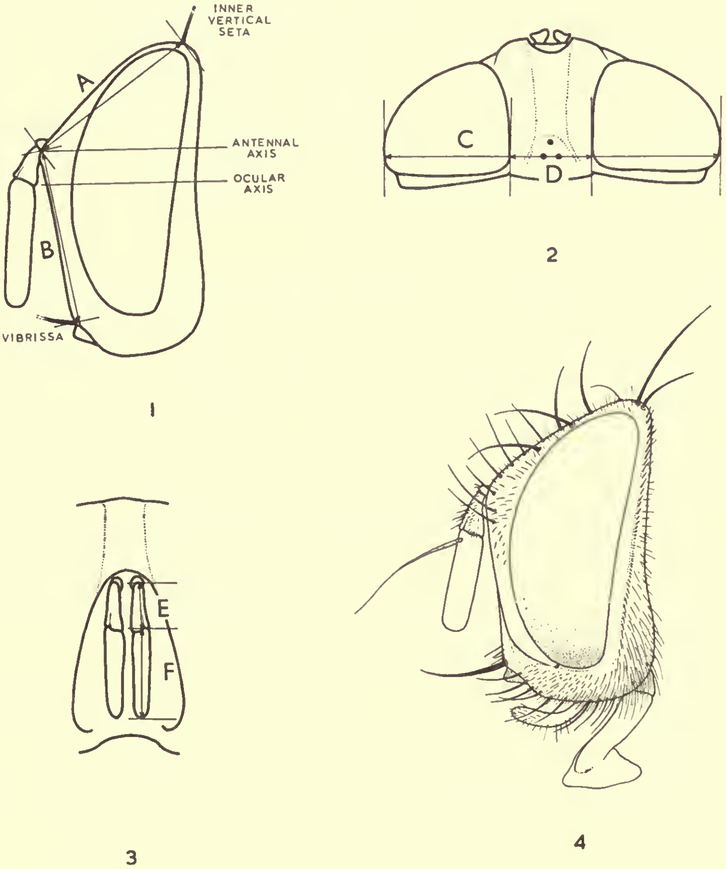
Distribution. Widespread in most of the Old World, particularly in the tropical areas: absent from British Isles and New Zealand. (The closely similar and related genus *Zygosturmia* Townsend occurs in the New World and differs from *Palexorista* by having the parafacials entirely bare and only a single pair of lateral scutellar setae.) The European species *Palexorista bohemica* (Mesnil) is established in Canada, from Ontario to Newfoundland and Nova Scotia, by introduction.

TAXONOMIC CHARACTERS AND SPECIES-GROUPING

The species of *Palexorista* are superficially much alike, especially in the female, and few can be reliably identified on external characters; the identity of most species must be confirmed on characters of the male genitalia, although several head characters and some abdominal characters are also useful (the only slightly useful characters on the thorax and its appendages are the colour of the mesonotal pollinosity and the length of the tarsal claws of the male).

The relative proportions of different head structures provide useful characters and the measurement points used for determining these are shown in Text-figs. 1–3. The following terms are used in descriptions of the head: *frontal length*, the distance measured in direct line with the head seen in profile from the base of the inner vertical seta to the lower basal point of the first antennal segment (measurement A in Text-fig. 1); *facial length*, the distance measured in direct line with the head seen in profile from the lower basal point of the first antennal segment to the base of the vibrissa (measurement B in Text-fig. 1); *antennal axis*, an imagined horizontal line through the head profile level with the lower basal point of the first antennal segment (*i.e.* the intersection point of the frontal and facial lengths); *ocular axis*, an imagined horizontal line through the head in profile at the level of the eye-middle. In species of *Palexorista* the frontal length is always longer than the facial length when measured but it is important to note that the character is deceptive if not measured since in many species the facial length *appears* to be longer than the frontal length: the antennal axis is always above or at most level with the ocular axis, never below it.

Some species have the frons conspicuously wider than others, and frons-vertex width is remarkably constant within a species: the width of the vertex (D in Text-fig. 2) as a proportion of the total head-width (C in Text-fig. 2) provides a valuable character and one of the few of any use for recognizing the females of some species. Other head characters of some taxonomic value include the length of the third antennal segment relative to the second with the head seen in facial view (Text-fig. 3), the



Figs. 1–4. 1–3, outline drawings of head and antennae of *Palexorista* in 1, profile, 2, dorsal view and 3, facial view showing measurement points used for determining proportions of head structures: (A) frontal length, from inner vertical seta to first antennal segment; (B) facial length, from first antennal segment to vibrissa; (C) head-width; (D) width of vertex; (E) length of second antennal segment; (F) length of third antennal segment. 4, Head of female of *Palexorista* in profile showing fine hairing of upper parafacial.

parafrontal colour, width of interfrontal area, extent of hairing on the parafacials, and the presence or absence of a row of black occipital setulae behind the postocular row (this last character requires caution as species normally possessing such setulae may occasionally have only one or two haphazard setulae or even none at all in some specimens).

Apart from the male genitalia, the most useful abdominal character is the size and form of the dense paired secondary sexual hair-patches on the venter of the fourth abdominal tergite (T4); some species are at once identifiable in the male if the hair-patches are exceptionally large or small, or the hairs less bunched than usual. Distribution of the abdominal pollinosity and the abundance of recumbent hair dorsally on T4 are of minor taxonomic value.

The male genitalia provide the most useful of all characters, the form of the apical part of the aedeagus (distiphallus) distinguishing the species into two main groups (see below), and the exact shape of the paralobes and mesolobes when seen exactly in profile or posterior view providing excellent specific characters; in some species the normal short fine hairs towards the apices of the paralobes are developed into short stubby black setulae (referred to in the descriptions as apical spinules), the development of which appears to be constant for the species. No useful characters have been discerned in the hypopygial parameres, although such may exist if these structures are later examined in more detail.

The species of *Palexorista* fall into two main groups on the basis of the aedeagus: in some species the distiphallus is distinctly bilobed when seen in profile (Text-figs. 29–31), but in others there is no largely membranous posterior lobe or only a very weakly developed trace of one (Text-figs. 32–36); in the descriptions that follow the two types of aedeagus have been referred to as " bifurcate " or " non-bifurcate " respectively. The differences in the aedeagus are associated with other reasonably constant features and two groups of species can be moderately well defined as follows:

Group I: distiphallus of aedeagus of bifurcate type (Text-figs. 29–31). Paralobes of male hypopygium usually with apical spinules. Frontal length (♂) 1·04–1·12 times as great as facial length (except *inconspicuoides*, about 1·22). Antennal axis much above ocular axis. Male abdomen almost always with a pair of strong setae apically on sternite 4 and with a long strong seta on each lobe of sternite 5.

Group II: distiphallus of aedeagus of non-bifurcate type (Text-figs. 32–36). Paralobes of male hypopygium without apical spinules. Frontal length (♂) 1·19–1·30 times as great as facial length. Antennal axis usually not much above ocular axis or even level with it. Male abdomen usually without strong apical setae on sternite 4 and usually only with hairs on lateral lobes of sternite 5.

Group I includes *P. inconspicuoides* (Baranov), *P. laetifica* (Mesnil), *P. laxa* (Curran), *P. lucagus* (Walker), *P. munda* (Wiedemann), *P. solennis* (Walker) and *P. subanajama* (Townsend) from the Oriental Region: it undoubtedly includes also *P. aequalis* (Malloch) from Samoa, *P. imberbis* (Wiedemann) and *P. zonata* (Curran) from Africa and several other African species.

Group II is less uniform than Group I and the species fall into some rather weakly defined sub-groups:

Mesolobes and paralobes of male hypopygium unusually short and broad, mesolobes in posterior view subtruncate: sub-group including *P. immersa* (Walker), *P. summaria* (Townsend) and *P. ophirica* (Walker). *P. bisetosa* (Baranov) perhaps belongs in this sub-group.

Mesolobes tapering in profile and with rounded apices in posterior view, paralobes slender and narrower than mesolobes in profile. Tarsal claws of male very small, shorter than last tarsal segment. Palpi more or less entirely yellow: sub-group including *P. painei* (Baranov), *P. sororcula* (Mesnil) and *P. parachrysops* (Bezzi).

Mesolobes in posterior view acuminate or rounded at the tips. Tarsal claws of male long. Palpi not entirely yellow. Antennae of male short: sub-group including *P. curvipalpis* (Wulp) and *P. deducens* (Walker).

Mesolobes in profile very much longer than paralobes (Text-fig. 54), in posterior view shaped as in Text-fig. 70. Tarsal claws of male long. Antennal axis conspicuously above ocular axis: sub-group including *P. bancrofti* sp. n.

The affinities of *P. dilaticornis* (Mesnil) and *P. reclinata* sp. n. are very uncertain and these species are not assignable to any of the groups or sub-groups outlined above.

KEY TO THE ORIENTAL SPECIES OF *PALEXORISTA*

(a) MALES

The following key includes all known Oriental species except *P. dilaticornis* (Mesnil), of which the male holotype is apparently lost and no other male material is known.

1 Frons without reclinate setae in addition to the two normal pairs of reclinate orbital setae. Gena slightly wider than or subequal in width to profrons. Vibrissae inserted well above mouth margin. Paralobes of hypopygium in posterior view not strongly convex 2

– Frons with a pair of strong reclinate setae below the normal two pairs of reclinate orbital setae (Text-fig. 78). Gena slightly narrower than profrons. Vibrissae inserted only very slightly above mouth margin. Paralobes of hypopygium in posterior view strongly convex (Text-fig. 79). [southern India] **P. reclinata** sp. n. (p. 86)

2 Aedeagus in profile distinctly bifurcate (Text-figs. 29–31), with a posterior lobe strengthened by sclerotization. Mesolobes of hypopygium pointed-acuminate apically (Text-figs. 55–61). Head profile with antennal axis conspicuously above ocular axis and frontal length 1·04–1·12 times as great as facial length (about 1·22 in *inconspicuoides*) 3

– Aedeagus in profile not bifurcate (Text-figs. 32–36), if with slightly developed posterior lobe this almost entirely membranous. Mesolobes of hypopygium less acuminate (except in *curvipalpis*), tips usually rounded or subtruncate (Text-figs. 64–71). Head profile with antennal axis only slightly above ocular axis and frontal length 1·19–1·30 times as great as facial length 9

3 Hair-patch of T4 unusually small (Text-fig. 23), sometimes almost obliterated, only about half as long as tergite and area of tergite basad of patch with normal hairing. Paralobes without apical spinules. Paralobes and mesolobes as in Text-figs. 43 and 60. [widespread from India to Tonga] . . **P. solennis** (Walker) (p. 57)

– Hair-patch of T4 large, more than half as long as tergite and area of tergite basad of patch devoid of normal hairing. Paralobes with small stubby apical spinules (except in *laxa*). Paralobes and mesolobes not as in Text-figs. 43 and 60 . . 4

4 Frons unusually wide, vertex 0·32–0·34 of head-width. Paralobes without apical spinules (Text-fig. 44). [Eastern Africa, India] . . . **P. laxa** (Curran) (p. 62)

– Frons narrower, vertex 0·24–0·28 of head-width. Paralobes with apical spinules (Text-figs. 37–42) 5

5 Hair-patch of T4 enormous, covering most of ventral surface of tergite (Text-fig. 24). Second antennal segment unusually long and third segment only about 2·4 times as long as second. Paralobes and mesolobes as in Text-figs. 38 and 56. [West Pakistan to New Guinea] . . . . **P. lucagus** (Walker) (p. 53)

– Hair-patch of T4 of usual size (Text-fig. 28). Third antennal segment 2·4–3·8 times as long as second segment. Paralobes and mesolobes not as in Text-figs. 38 and 56 6

6 Ocellar setae absent or at most minute hair-like. Abdominal ground colour conspicuously red antero-laterally. Parafacial wider than third antennal segment. Paralobes and mesolobes as in Text-figs. 42 and 59, paralobes in profile very broad basally. Vertex wider, 0·27–0·28 of head-width. [Ceylon] **P. laetifica** (Mesnil) (p. 49)

– Ocellar setae present. Abdominal ground colour not noticeably reddish basally. Parafacial subequal in width to or narrower than third antennal segment. Paralobes and mesolobes not as in Text-figs. 42 and 59, paralobes in profile more slender. Vertex usually narrower, 0·24–0·27 of head-width. 7

7 Facial profile long, frontal length about 1·04 times the facial length. Antennae long, third segment 3·0–3·8 times as long as second segment. Paralobes and mesolobes elongate, as in Text-figs. 37 and 55. [Malaya to Queensland and Solomon Islands] **P. subanajama** (Townsend) (p. 55)

– Facial profile shorter, frontal length 1·12–1·22 times the facial length. Antennae short, third segment 2·4–2·7 times as long as second segment. Paralobes and mesolobes shorter, not as in Text-figs. 37 and 55 8

8 Upper occiput with an irregular row of black setulae. Distinctly yellowish pollinose on thorax and abdomen. Hypopygium with mesolobes rather broad in profile and paralobes not noticeably angled and tapering (Text-fig. 41). [Formosa] **P. inconspicuoides** (Baranov) (p. 50)

– Upper occiput without black setulae behind postocular row. Greyish or pale yellowish grey pollinose on thorax and abdomen. Hypopygium in profile with mesolobes more slender, paralobes distinctly angled medially and more tapering on terminal part (Text-fig. 40). [India] . . . . **P. munda** (Wiedemann) (p. 52)

9 Outer vertical setae well developed. Claws very small and much shorter than fifth tarsal segment. [Formosa] . . . . **P. bisetosa** (Baranov) (p. 67)

– Outer vertical setae undeveloped, hair-like and hardly distinguishable from uppermost setulae of postocular row. Tarsal claws long, subequal to or longer than last tarsal segment (except in *painei* and *sororcula*) 10

10 Mesolobes shaped as in Text-figs. 48 and 71. Frons narrow, vertex 0·23–0·25 of head-width. Antennae very short, third segment 2·0–2·2 times as long as second segment. Puparium with strongly serpentine spiracular slits. [Celebes, Buru] **P. deducens** (Walker) (p. 76)

— Mesolobes differently shaped. Frons wider, vertex 0·26–0·33 of head-width. Antennae longer, third segment 2·6–3·3 times as long as second segment (except in *curvipalpis*, 2·1–2·4). Puparium with simple or at most slightly sinuous spiracular slits (not known for all species) 11

11 Paralobes of hypopygium much shorter than mesolobes (Text-fig. 54), mesolobes of unusual shape in posterior view as in Text-fig. 70. Head profile as in Text-fig. 22. Hairing of T4 and T5 unusually long and fine. [Queensland] **P. bancrofti** sp. n. (p. 85)

— Paralobes of hypopygium subequal in length to mesolobes (Text-figs. 49–52), at most only slightly shorter (Text-fig. 53). Hairing of T4 and T5 not unusually long and fine 12

12 Paralobes slender, narrower than mesolobes in profile (Text-figs. 51–53). Mesolobes with rounded or slightly pointed tips (Text-figs. 67–69). Tarsal claws small, shorter than or subequal to last tarsal segment. Palpi yellow, at most slightly darkened at extreme base. Third antennal segment 2·6–2·8 times as long as second segment, and extensively reddish orange basally and on inner edge . . 13

— Paralobes broad, subequal in width to or wider than mesolobes in profile (Text-figs. 46–47, 49–50). Mesolobes subtruncate apically (Text-figs. 64–66), except in *curvipalpis*. Tarsal claws long, length exceeding that of last tarsal segment. Palpi brownish with pale tawny apices. Third antennal segment either relatively shorter (2·1–2·4 times second segment) or longer (3·0–3·3 times second segment), usually entirely blackish brown, at most only narrowly reddish orange at extreme base 15

13 Paralobes and mesolobes as in Text-figs. 52 and 68. Parafrontals pale golden to golden orange pollinose against interfrontal and pale silvery yellowish towards eyes. Upper occiput without black setulae behind postocular row. About five or six pairs of cruciate frontal setae. T4 with sparse long strong hair in only about three or four series. Hair-patch of venter of T4 large and loose with tips of hairs overlapping edge of tergite (Text-fig. 25). [India, Ceylon, Malaya] **P. parachrysops** (Bezzi) (p. 78)

— Paralobes and mesolobes differently shaped. Parafrontals unicolorous or more golden on upper parts only, not yellow or golden just along the rows of frontal setae. Upper occiput with black setulae behind the postocular row. About seven to ten pairs of cruciate frontal setae. T4 with shorter more dense and fine hair in about five to seven series. Hair-patch compact as in Text-figs. 27 and 28 . . 14

14 Mesolobes long, in posterior view open slit between tips much shorter than fused part (Text-fig. 67). Paralobes longer and more slender (Text-fig. 53). Vertex 0·32 of head-width. Parafrontals all greyish pollinose. Greyish pollinose species with mainly dark abdominal ground colour. Hair-patch of T4 very similar to that of *curvipalpis* (Text-fig. 28). [Queensland] . . **P. sororcula** (Mesnil) (p. 83)

— Mesolobes short, in posterior view open slit between tips subequal in length to fused part (Text-fig. 69). Paralobes shorter and relatively broader (Text-fig. 51). Vertex 0·27–0·29 of head-width. Parafrontals pale yellow to golden on upper two-fifths and contrasting with more silvery lower parts. Golden pollinose species with mainly reddish orange abdominal ground colour. Hair-patch of T4 smaller (Text-fig. 27), less than half width of tergite venter. [Java] **P. painei** (Baranov) (p. 81)

15 Mesolobes pointed-acuminate in posterior view (Text-fig. 63). Upper occiput without black setulae behind postocular row. Parafacial nearly bare, usually only one or two very minute hairs immediately below lowest frontal seta. Antennae short, third segment 2·1–2·4 times as long as second segment. Head profile with unusually strongly convex frons (Text-fig. 15). Head almost always entirely silvery grey pollinose. [Ceylon to Queensland] . **P. curvipalpis** (Wulp) (p. 68)

— Mesolobes subtruncate apically in posterior view (Text-figs. 64–66). Upper occiput with black setulae behind postocular row, sometimes very few. Parafacial distinctly haired on uppermost fifth or quarter, sometimes more. Third antennal segment 3·0–3·3 times as long as second segment (except in *ophirica*). Frons less strikingly convex. Head sometimes pale yellowish pollinose, at least parafacials usually silvery 16

16 Antennae short, third segment 2·3–2·4 times as long as second segment. Mesolobes very long and narrower in profile (Text-fig. 47). Vertex 0·26–0·28 of head-width. [Malaya and Java] . . . . **P. ophirica** (Walker) (p. 70)

— Antennae long, third segment 3·1–3·3 times as long as second segment. Mesolobes short and very broad in profile (Text-figs. 49 and 50). Vertex 0·28–0·31 of head-width 17

17 Mesolobes in posterior view as in Text-fig. 65. Hair-patch of T4 larger, similar to that of *curvipalpis* (Text-fig. 28). [Formosa, Celebes, New Guinea] **P. immersa** (Walker) (p. 72)

— Mesolobes in posterior view as in Text-fig. 66. Hair-patch of T4 smaller and very compact (Text-fig. 26). [Sumatra] . . . **P. summaria** (Townsend) (p. 74)

(b) FEMALES

Females of the species of *Palexorista* are often very alike and offer few really satisfactory key characters; the following key should help in distinguishing the species for which the females are known, but must be used with caution. The female is not yet known of *P. bisetosa*, *P. deducens*, *P. ophirica*, *P. reclinata*, *P. sororcula*.

1 Upper occiput without black setulae behind postocular row, rarely with one or two isolated dark setulae 2

– Upper occiput with a distinct irregular row of black setulae behind the postocular row 8

2 Head in facial view with inner margins of eyes strikingly concave (Text-fig. 76), area between eyes widest at about mid height. Interfrontal area much narrower than a parafrontal. Palpi yellow. Base of third antennal segment extensively reddish orange. Fourth abdominal tergite with only about four series of hairs **P. parachrysops** (Bezzi) (p. 78)

– Head in facial view with inner margins of eyes not distinctly bowed medially, area between eyes widest near vibrissal level (Text-fig. 77). Interfrontal area subequal in width to parafrontal or only slightly narrower. Palpi brownish basally and tawny on expanded tips. Third antennal segment usually all blackish brown. Fourth abdominal tergite usually with about six to eight hair series . . . 3

3 Frons exceptionally wide, vertex 0·35–0·37 of head-width. Parafacial wider than third antennal segment. [Eastern Africa, India: parasite on *Heliothis*] **P. laxa** (Curran) (p. 62)

– Frons not strikingly wide, vertex 0·28–0·33 of head-width. Parafacial narrower than or subequal in width to third antennal segment, sometimes very slightly wider. [not African, not known ex *Heliothis*] 4

4 Second antennal segment unusually long relative to third, third segment only 1·9–2·2 times as long as second segment. Small species, length usually about 6 mm. [Ceylon to New Guinea] . . . . **P. lucagus** (Walker) (p. 53)

– Second antennal segment not noticeably long compared to third, third segment 2·2–2·8 times as long as second segment. Larger species, usually 7·5–10 mm. . 5

5 Vertex 0·28–0·29 of head-width. Parafrontals pale yellowish to golden pollinose and contrasting with silvery parafacials. Noticeably yellowish pollinose species. [Sumatra to New Guinea and Queensland] . **P. subanajama** (Townsend) (p. 55)

– Vertex 0·30–0·32 of head-width. Parafrontals and parafacials more or less unicolorous pollinose, or if parafrontals more yellowish than parafacials then usually not noticeably contrasting 6

6 Parafacials yellowish white and parafrontals pale yellowish pollinose, head pollinosity not noticeably silvery. Antennal axis far above ocular axis. [southern India] **P. munda** (Wiedemann) (p. 52)

– Parafacials and parafrontals, especially the former, silver or silvery grey pollinose, parafrontals rarely slightly yellowish. Antennal axis not obviously far above ocular axis 7

7 Antennae shorter, third segment only 2·2–2·4 times as long as second segment. [Ceylon to Queensland]. . . . . . . **P. curvipalpis** (Wulp) (p. 68)

– Antennae longer, third segment 2·6–2·8 times as long as second segment. [known from Formosa, Celebes, New Guinea] . . . **P. immersa** (Walker) (p. 72)

8 Parafrontal about 1·6 times as wide as interfrontal area at level of lower proclinate orbital seta. Most of abdomen with reddish orange ground colour, especially T5, the pollinose areas bright golden. Thoracic pollinosity distinctly golden yellowish. Upper parts of parafrontals pale yellow to golden and contrasting with more silvery pollinose lower parts of parafrontals. Palpi yellow, indistinctly darkened at extreme base. [Java] . . . . ***P. painei*** (Baranov) (p. 81)

– Parafrontal at level of lower proclinate orbital seta subequal in width to or only a little wider than interfrontal area. Abdomen with mainly blackish ground colour, sometimes reddish antero-laterally, pollinosity not bright golden. Thoracic pollinosity greyish to pale yellowish, usually not conspicuously golden. Parafrontals more or less unicolorous. Palpi dark brownish basally and paler tawny on expanded tips 9

9 T5 with the usual well developed discal setae. Third antennal segment blackish brown. T4 dorsally with about eight or nine hair series 10

– T5 with discals represented by long fine hairing, without strongly developed discal setae. Third antennal segment extensively reddish orange. T4 dorsally with about eight or nine hair series, the hair finer than usual. [Queensland] ***P. bancrofti*** sp. n. (p. 85)

10 Antennae very heavy, third segment 3·6 times as long as second segment and conspicuously broader than parafacial. [India]. . . ***P. dilaticornis*** (Mesnil) (p. 65)

— Antennae not unusually heavy, third segment 2·2–3·2 times as long as second segment and not noticeably wider than parafacial 11

11 Ocellar setae absent, occasionally a minute seta on one or both sides. Abdomen with distinct reddish ground colour antero-laterally. Third antennal segment 2·4–2·7 times as long as second segment. [Ceylon] . . ***P. laetifica*** (Mesnil) (p. 49)

— Ocellar setae present. Abdominal ground colour entirely blackish. Third antennal segment usually either relatively longer or shorter 12

12 Antennae short, third segment about 2·2 times as long as second segment. Vertex 0·32 of head-width. Parafacial with only very few hairs confined to uppermost fifth or quarter. Antennal axis not obviously well above ocular axis. [Formosa] ***P. inconspicuoides*** (Baranov) (p. 50)

— Antennae longer, third segment 2·6–3·2 times as long as second segment. Vertex narrower, usually 0·29–0·30 of head-width (range 0·28–0·31). Parafacial with the fine hairs on uppermost third or half. Antennal axis conspicuously above ocular axis. [widespread in Oriental Region to Queensland and Pacific islands] ***P. solennis*** (Walker) (p. 57)

DESCRIPTIONS OF THE SPECIES

Palexorista laetifica (Mesnil, 1951)

(Text-figs. 9, 42, 59)

Drino laetifica Mesnil, 1951 : 190. Holotype ♂, Ceylon. In British Museum (Natural History), London. [Examined]
Palexorista laetifica (Mesnil) Crosskey, 1966 : 136.

♂. Head profile as in Text-fig. 9, frontal length about 1·09 times as great as facial length, antennal axis conspicuously above ocular axis. Vertex 0·26–0·28 of head-width. Ocellar setae usually completely absent, sometimes small hair-like setae present on one or both sides. Upper occiput with irregular row of black setulae behind postocular row. Interfrontal area subequal in width to parafrontal or very slightly narrower. Parafrontals mainly clear pale yellow pollinose, lower ends of parafrontals more creamy whitish pollinose especially against eyes, general yellow colour of parafrontals contrasting with silvery white or creamy whitish pollinose face and parafacials. Parafacial obviously broader than third antennal segment, with sparse fine hairs on upper half, sometimes lower halves of parafacials also with a few small hairs. Antennae of medium length, third segment 2·4–2·7 times as long as second segment and entirely black-brown. Palpi brownish basally with extensively yellow tips. Mesonotum pale yellow pollinose, giving species a distinctly yellowish appearance to naked eye. Tarsal claws long. Abdomen with blackish brown ground colour medially but extensively reddish orange antero-laterally, fifth tergite also usually rather reddish, pollinosity pale greyish yellow and with rather shifting appearance, T3 and T4 both broadly black on hind margins to naked eye, the dark hind margin of T4 occupying about two-fifths of tergite length. Median marginal setae of T3 and marginal row of T4 rather short and stubby; T4 dorsally with about eight or nine hair series; discal setae of T5 short and strong. Hair-patches of T4 venter very large, similar to those of *curvipalpis* (Text-fig. 28). Genitalia: aedeagus of bifurcate type; paralobes and mesolobes broader in profile than in most species with bifurcate aedeagus (Text-fig. 42), paralobes slightly tapering and with stubby black apical spinules; mesolobes in posterior view as in Text-fig. 59. Length about 9–10 mm.

♀. Vertex 0·29–0·32 of head-width. Third antennal segment 2·4–2·7 times as long as second segment. T4 dorsally with about six to eight hair series. Pale lemon-yellow colour of parafrontals more strikingly contrasting with silvery white parafacials than in ♂.

Material examined. Holotype ♂. CEYLON: Kandy, 6.ii.1923 (*F. P. Jepson*).

Other material. CEYLON: 4 ♂, Galaha, 15.viii.1925 (*F. P. Jepson*) (B.M. Nat. Hist.); 3 ♂, 3 ♀, Galaha, 15.viii.1925 (*J. C. Hutson*) (B.M. Nat. Hist.); 1 ♀, Galaha, 27.xii.1913 (*A. Rutherford*) (B.M. Nat. Hist.); 2 ♀, Kandy, 6.ii.1923 (*J. C. Hutson*) (B.M. Nat. Hist.).

Distribution. Only known from Ceylon.

Hosts. *Eterusia cingala* Moore (Lepidoptera : Zygaenidae). All specimens listed above except for the one collected by Rutherford were reared from larvae of this zygaenid, but it should be noted that they each bear a label with the spelling *Heterusia*—the name of a Neotropical geometrid genus. Mesnil's (1951 : 191) reference to the type being from *Heterusia cingala* should read *Eterusia cingala*.

This species is one of the rather uniform group in which the apices of the paralobes of the male hypopygium bear stubby black spinules, but it is readily distinguished from its relatives by the broader paralobes and (normally) by the complete absence of ocellar setae. *P. laetifica* is one of the several species confused by Baranov, and the specimens (listed above) collected by Hutson each bear an erroneous determination label in Baranov's writing as " sturmia inconspicuoides Baranoff ".

Palexorista inconspicuoides (Baranov, 1932)

(Text-figs. 8, 30, 41, 58)

Sturmia inconspicuoides Baranov, 1932 : 80. Lectotype ♂, FORMOSA. In Deutsches Entomologisches Institut. [Examined]
Drino (*Prosturmia*) *inconspicuoides* (Baranov) Mesnil, 1951 : 188.
Palexorista inconspicuoides (Baranov) Crosskey, 1966 : 136.

Lectotype Designation: Baranov described *Sturmia inconspicuoides* from an unstated number (" zahlreiche ") of male and female syntypes collected by Sauter on unspecified dates at Kankau and Sokutsu in Formosa. Twelve syntypes have been located; in the collections of the Deutsches Entomologisches Institut (4 ♂, 4 ♀), the United States National Museum (2 ♂, 1 ♀) and the British Museum (1 ♂), each bearing an identification and a type label; one male in Deutsches Entomologisches Institut has been labelled and is here designated as LECTOTYPE. Three of the male paralectotypes in the D. Ent. Inst. collection lack the abdomen and three of the females are probably not conspecific with the lectotype.

♂. Head profile as in Text-fig. 8, frontal length about 1·22 times as great as facial length, antennal axis distinctly above ocular axis. Vertex 0·24–0·26 of head-width, upper frons narrow. Upper occiput with an irregular row of black setulae behind postocular row. Interfrontal area subequal in width to parafrontal or a little wider. Outer vertical setae undeveloped. Parafrontals dingy yellowish white to brassy yellow pollinose, not noticeably contrasting in colour with whitish or very pale yellowish pollinose face and parafacials. Parafacials rather narrow, at mid height about subequal in width to third antennal segment or slightly narrower, haired on about uppermost quarter. Antennae of medium length, third segment about 2·5–2·7 times as long as second segment and entirely blackish brown. Palpi brownish with tawny yellowish apices. Mesonotum with yellow pollinosity, giving species a distinctly yellowish appearance, occasionally pale greyish yellow. Tarsal claws long, longer than last tarsal segment. Abdominal ground colour mainly blackish brown but reddish laterally on T3, pollinosity pale yellowish or yellowish white with shifting appearance on intermediate tergites, dark hind margin of T4 occupying about one third of length of tergite. Dorsal hair of T4 in about six to eight series, discal setae of T5 moderately strong. Hair-patches of T4 venter large, similar to those of *curvipalpis* (Text-fig. 28). Genitalia: aedeagus of bifurcate type (Text-fig. 30); paralobes with apical spinules, in lateral view wider than mesolobes (Text-fig. 41), paralobe rather parallel-sided and not noticeably angulate near middle (cf. *munda*, Text-fig. 40); mesolobes in posterior view elongate and acuminate (Text-fig. 58). Length 8–11 mm.

♀. Vertex 0·32 of head-width. Third antennal segment about 2·2 times as long as second segment. Interfrontal area distinctly wider than parafrontal. Dorsum of T4 with about six hair series.

Material examined. Lectotype ♂. FORMOSA: Kankau, Koshun, 7.viii.1912 (*H. Sauter*).

Paralectotypes. FORMOSA: 1 ♂, Sokutsu, ix.1912 (*H. Sauter*) (B.M. Nat. Hist.); 1 ♂, 1 ♀, data as for lectotype (D. Ent. Inst.); 2 ♂, Sokutsu, ix.1912 (*H. Sauter*) (D. Ent. Inst.).

Two female paralectotypes with the same data as the lectotype, and a female paralectotype from Kankau, ix.1912, have been examined from D. Ent. Inst. collection but are considered to be misidentified and not conspecific with the lectotype.

Distribution. The true *Palexorista inconspicuoides* (Baranov) is known only from Formosa and I have seen no material other than the original syntypes. It is possible that *inconspicuoides* occurs elsewhere in the Oriental Region, but there is no evidence as yet that it does so and I have found no specimens that are assignable to the true *inconspicuoides* among the large amount of Oriental material seen.

The literature on agricultural and forest entomology in the Oriental Region contains records of *Sturmia inconspicuoides* Baranov from India (Beeson & Chatterjee, 1935; Cherian, 1937; Cherian & Kylasam, 1939; Cherian & Anantanarayanan, 1941), Burma (Garthwaite & Desai, 1939), Malaya (Corbett & Miller, 1933; Corbett, 1937), Indonesia (Tjien Mo, 1939), Queensland (Bell, 1936, 1937, 1938), and Solomon Islands (Lever, 1935) but these records are based on misidentifications made by

Baranov (who identified Oriental Tachinidae for the Imperial Institute of Entomology between 1932 and 1940): the British Museum collection contains specimens of five species (*subanajama*, *lucagus*, *laetifica*, *ophirica* and *curvipalpis*) misidentified by Baranov as *inconspicuoides*, most being part of the material on which the foregoing erroneous records were based. Baranov's (1934*a*, 1936) published records of *inconspicuoides* from New Britain, Fiji and the Solomon Islands are due to misidentification.

Hosts. Unknown. All the host records for *Sturmia inconspicuoides* appearing in the literature (these are detailed in the later section on host records) are either erroneous or very suspect because of misidentification of the tachinid parasites involved. As noted above, Baranov confused at least five species under the name *inconspicuoides* and the published host records for this species are based on identifications made by Baranov for the Imperial Institute of Entomology.

P. inconspicuoides is one of the complex of species in which the aedeagus is of the bifurcate type and the paralobes of the male hypopygium bear apical spinules. It is most closely related to *P. munda* (Wiedemann), from southern India, but should probably be regarded as a distinct species because of the differently shaped paralobes, the presence of a row of black setulae on the upper occiput (absent in *munda*), the narrower parafacials, and differences in the pollinosity. Mesnil (1949 : 19) placed the name *inconspicuoides* in synonymy with *Drino* (*Prosturmia*) *profana* (Townsend), but this synonymy was wrongly established; examination of the type-material of *profana* shows that it belongs to another species (see *solennis* Walker). Mesnil (1951 : 188) was himself later doubtful of the synonymy and treated *inconspicuoides* as valid, then indicating *profana* as only doubtfully the same.

Palexorista munda (Wiedemann, 1830)

(Text-figs. 7, 40, 57)

Tachina munda Wiedemann, 1830 : 234. Holotype ♀, INDIA. In Universitetets Zoologiske Museum, Copenhagen. [Examined]
Drino (*Prosturmia*) *munda* (Wiedemann) Crosskey, 1963 : 80.
Palexorista munda (Wiedemann) Crosskey, 1966 : 136.

♂. Head profile as in Text-fig. 7, frontal length about 1·12 times as great as facial length, antennal axis conspicuously above ocular axis. Vertex 0·25–0·27 of head-width, upper frons rather narrow. Upper occiput without black setulae behind postocular row. Interfrontal area equal in width to parafrontal. Parafrontals very pale greyish yellow pollinose and not contrasting in colour with creamy whitish pollinose face and parafacials. Parafacials about equal in width to, or slightly wider than, third antennal segment, haired on about uppermost third or two-fifths. Antennae of medium length, third segment 2·4–2·6 times as long as second segment and entirely blackish brown. Palpi dark brown basally and tawny yellowish at tips. Mesonotum pale grey or slightly yellowish grey pollinose, species appearing greyish and not at all yellowish to naked eye. Tarsal claws long. Abdomen mainly dark, only indistinctly reddish brown in ground colour basally, with pale greyish yellow pollinosity, intermediate tergites broadly dark posteriorly, about posterior quarter of T4 black, pollinosity of intermediate tergites with slightly shifting appearance. Dorsal hair of T4 in about seven or eight series; discal setae of T5 moderately strong. Hair-patches of T4 venter large, similar to those of *curvipalpis* (Text-fig. 28). Genitalia: aedeagus of bifurcate type and exactly similar to that of *incon-*

spicuoides (Text-fig. 30); paralobes and mesolobes in lateral view as in Text-fig. 40, paralobes slightly angled and tapering on distal half, with apical spinules; mesolobes in posterior view as in Text-fig. 57. Length about 8·5–10 mm.

♀. Vertex 0·30–0·32 of head-width. Third antennal segment 2·0–2·4 times as long as second segment. Interfrontal area at narrowest distinctly narrower than parafrontal. Parafacial hair on as much as upper half. Dorsal hair of T4 in about six or seven series. [Detailed description of ♀ holotype in Crosskey (1963).]

Material examined. Holotype ♀. SOUTH INDIA: Tranquebar (no other data).

Other material. SOUTH INDIA: 2 ♂, 1 ♀, Coimbatore, ex *Hippotion*, 15.i.1917 (B.M. Nat. Hist.); 1 ♂, Coimbatore, xi.1951 (*P. S. Nathan*) (B.M. Nat. Hist.); 1 ♂, Coimbatore, xii.1951 (*P. S. Nathan*) (Can. Nat. Coll.).

Distribution. Southern India.

Hosts. *Hippotion* sp. (Lepidoptera : Sphingidae).

Palexorista munda is very closely allied to *P. inconspicuoides* from Formosa, but appears certainly to be a distinct species: it differs from *inconspicuoides* in the head facies, less yellow colour, broader and more angulate-tapering paralobes of the male hypopygium, and in the absence of a row of black setulae on the upper occiput.

The name *munda* Wiedemann has been misused by several authors, and Mesnil (1952 : 236) cited the name as a senior synonym of *Blepharella lateralis* Macquart, type-species of *Blepharella* Macquart (syn. *Podomyia* Brauer and Bergenstamm). The identity of Wiedemann's type of *Tachina munda* was discussed in a recent paper (Crosskey, 1963), where it was shown that *munda* is a sturmiine with bare facial ridges assignable to *Prosturmia* Townsend (now in synonymy with *Palexorista*) and not to *Blepharella*; *munda* is not an older name for *lateralis* Macquart.

Palexorista lucagus (Walker, 1849)

(Text-figs. 6, 24, 31, 77)

Tachina lucagus Walker, 1849 : 768. Holotype ♂, CHINA. In British Museum (Natural History), London. [Examined]
Lydella lucagus (Walker) Bigot, 1892 : 185.
Blepharipoda lucagus (Walker) Husain & Mathur, 1924 : 121.
Palexorista lucagus (Walker) Crosskey, 1966 : 1366.

♂. Head profile as in Text-fig. 6, frontal length about 1·04 times as great as facial length, antennal axis well above ocular axis. Vertex 0·27–0·28 of head-width. Upper occiput without black setulae behind postocular row, rarely one or two isolated adventitious black setulae. Interfrontal area usually slightly wider than parafrontal. Parafrontals very pale brassy yellowish or greyish yellow, colour merging into and not contrasting with creamy or rather shining whitish pollinose face and parafacials. Parafacials narrow, distinctly narrower than third antennal segment, haired on about uppermost third or quarter. Antennae with second segment unusually long, third segment about 2·4 times as long as second segment and entirely blackish brown except for trace of orange colour at junction with second segment. Palpi brownish basally and more tawny or yellowish apically. Mesonotum with very pale greyish yellow or pale yellow pollinosity, general appearance of species slightly yellowish, especially in specimens from New Guinea; black vittae of mesonotum conspicuous and sometimes edged with bronze-brown pollinosity. Tarsal claws long. Abdomen with blackish brown ground colour and very pale yellowish grey pollinosity, intermediate tergites with slightly shifting appearance and both broadly black posteriorly, marginal dark band of T4 occupying about two-fifths of length of tergite. Dorsal hair of T4 in about four to six series; discal setae of T5 very strong. Hair-patches of T4 venter very characteristic, exceptionally large and occupying almost all of tergite venter (Text-fig. 24), area around hair-patch bare and shining metallic black. Genitalia: aedeagus of bifurcate type (Text-fig. 31); paralobes and mesolobes slender, latter in profile rather straight and evenly tapering (Text-fig. 38); paralobes with small apical spinules; mesolobes in posterior view as in Text-fig. 56. Length usually about 6 mm., ranging from 4·8–7·5 mm., smaller than average species.

♀. Vertex 0·31–0·33 of head-width. Second antennal segment strikingly long, more noticeably so than in ♂, facial view of head and antennae as in Text-fig. 77, third antennal segment 1·7–2·2 times as long as second segment. Interfrontal area subequal in width to parafrontal. Dorsal hair of T4 in only four or five series, hair therefore sparser than usual.

Puparium: spiracular slits slightly sinuous, surface hairs not at all spiniform.

Material examined. Holotype ♂. CHINA: Foo-chow-foo (*G. T. Lay*).

Other material: WEST PAKISTAN: 4 ♂, Punjab, Lyallpur, par. on *Creatonotus gangis* L. on pulses, 25.x.1916 (*D. Nathi*). INDIA: 2 ♂, 3 ♀, S. Malabar, Vadakampuram, par. on *Spodoptera mauritia*, 15–21.iv.1916 (*P.S.*); 1 ♀ with puparium, S. Malabar, Tirurangady, par. on *Spodoptera mauritia* on paddy, 18.vi.1919 (*Dy. Tahsildar*); 1 ♂ with puparium, Bangalore, ex caterpillar of *Lymantria* sp. on mango, xii.1962; 1 ♂, Bangalore, ex hairy caterpillar on ground, ix.1962. CEYLON: 1 ♀, Peradeniya, vi.1909. THAILAND: 1 ♂, Siam, Bangkok, ex *Spodoptera* sp. larva, 1934–35 (*A. Manjikul*). MALAYA: 1 ♂, Pahang, ex *Spodoptera* sp., 31.iii.1927 (*G. H. Corbett*). NEW GUINEA: 4 ♂, 1 ♀, Papua, Kapogere, 60 m. S.E. of Port Moresby, 3.v.1965 (*R. W. Crosskey*); 1 ♀, Papua, Central District, Musgrave River, 6.v.1965 (*R. W. Crosskey*); 1 ♀, Papua, Central District, Musgrave River, 18.vii. 1965 (*R. W. Crosskey*); 2 ♂, Morobe District, Wau, 3,500–4,000 ft., 19 and 23.v.1965 (*R. W. Crosskey*); 1 ♀, Morobe District, near Wau, Nami Creek, 5,500 ft., 22.v.1965 (*R. W. Crosskey*); 4 ♂, 5 ♀, Morobe District, Bubia, 9 m. W. of Lae, 16–21.vi.1965 (*R. W. Crosskey*).

All above-listed material in British Museum (Natural History).

Distribution. Although as yet known only from a small amount of material, *P. lucagus* (Walker) appears to be a widespread species in the Oriental Region, occurring from West Pakistan and Ceylon eastwards to China and New Guinea. There are few records as yet from south-east Asia and none from Indonesia, although *lucagus* probably occurs here. *P. lucagus* possibly occurs in Queensland, as it is present in Papua, but it is not yet known from Australia.

Hosts. Known from the following lepidopterous hosts: *Creatonotos gangis* (Linnaeus) from West Pakistan [Arctiidae], *Spodoptera mauritia* (Boisduval) [Noctuidae] in India and *Spodoptera* sp. in Thailand and Malaya, and *Lymantria* sp. [Lymantriidae] in India. The specimens listed above from West Pakistan reared from *Creatonotos gangis* are part of the material on which Husain & Mathur (1924) based their record of *lucagus* parasitic on this host.

Palexorista lucagus is one of the most distinctive Oriental species of the genus on external characters because of the enormous abdominal hair-patches of the male, much larger than in other species, and because of the unusually long second antennal segment which forms a particularly notable character in the female: although differing from other species in these characters, the general affinities of *lucagus* are with the other species in which the male paralobes bear apical spinules. In the small size and overall facies there is close resemblance to *P. solennis* (except in the large male hair-patch), but this species differs from *lucagus* in lacking spinules on the paralobes of the male hypopygium.

Palexorista subanajama (Townsend, 1927)

(Text-figs. 5, 37, 55)

Prosturmia subanajama Townsend, 1927 : 69. Lectotype ♂, SUMATRA. In Zoölogisch Museum, Amsterdam. [Examined]

Palexorista subanajama (Townsend) Crosskey, 1966 : 136.

Lectotype Designation: the type-material of *P. subanajama* comprises two conspecific male syntypes, one in the Zoölogisch Museum, Amsterdam and one in the United States National Museum, Washington; the specimen in Amsterdam has been labelled and is here designated as LECTOTYPE.

♂. Head profile as in Text-fig. 5, frontal length about 1·04 times as great as facial length, antennal axis far above ocular axis. Vertex 0·24–0·26 of head-width, upper frons usually rather noticeably narrow. Upper occiput without black setulae behind postocular row, occasionally one or two adventitious setulae present. Interfrontal area subequal in width to a parafrontal. Parafrontals with pollinosity varying in colour from pale grey (as in lectotype) to brassy yellow, usually greyish yellow, contrasting noticeably with white or creamy whitish pollinose face and parafacials; parafacials sometimes pale brassy yellow pollinose in specimens with more golden parafrontals. Parafacials narrow, a little narrower than third antennal segment, rather conspicuously and finely long haired on uppermost third or half. Antennae long, third segment 2·9–3·8 times as long as second segment (3·8 times in lectotype) and entirely blackish brown. Palpi brown or blackish brown, sometimes more yellow brown and with more yellowish or tawny brown apices. Mesonotum with pollinosity varying from pale grey (as in lectotype) to golden yellow, usually pale yellowish, sometimes with traces of bronze-brown pollinosity around the black vittae; dorsum of thorax usually distinctly yellowish to naked eye. Tarsal claws long. Abdomen with dark brown to blackish ground colour and pale grey to golden yellow pollinosity, pattern of intermediate tergites with slightly shifting appearance, most of T3 dark dorsally with the dark area extending medially nearly to fore margin so that the yellow or greyish pollinosity is mainly antero-lateral, pollinosity of T4 on basal half only so that to naked eye at least posterior half of this tergite appears black. Dorsal hair of T4 in about six to eight series; discal setae of T5 long and moderately strong. Hair-patches of T4 venter of medium to large size, much as in *curvipalpis* (Text-fig. 28). Genitalia: aedeagus of bifurcate type, similar to that of *inconspicuoides* (Text-fig. 30); paralobes and mesolobes elongate, paralobes with stubby black apical spinules and mesolobes in profile straight and rather evenly tapering (Text-fig. 37); mesolobes in posterior view as in Text-fig. 55. Length usually about 8–9·5 mm., ranging from 5·8–10·9 mm. in material seen.

♀. Vertex 0·28–0·29 of head-width. Third antennal segment 2·2–2·6 times as long as second segment. Interfrontal area slightly, but distinctly and rather consistently, wider than a parafrontal. Parafacials usually less extensively haired than in ♂, hairing confined to uppermost quarter or third.

Material examined. Lectotype ♂. SUMATRA: Suban Ajam, vii.1916 (*E. Jacobson*). Paralectotype ♂. Data as for lectotype (U.S. Nat. Mus.).

Other material. MALAYA: 2 ♂, Temerloh, ix.1922 (*G. H. Corbett*). SARAWAK: 1 ♂, foot of Mt. Dulit, junction of rivers Tinjar and Lejok, 5.ix.1932 (*B. M. Hobby* &

A. W. Moore). NEW GUINEA: 1 ♂, 1 ♀, Japen Island, camp 2, Mt. Eiori, 2,000 ft., xi.1938 (*L. E. Cheesman*); 1 ♂, Waigeu, Camp Nok, 2,500 ft., iv.1938 (*L. E. Cheesman*); 1 ♀, Papua, Ishurava, 3,000 ft., vii.1933 (*L. E. Cheesman*); 1 ♂, 2 ♀, Papua, Northern District, Moale Plantation, ix.1965 (*T. Bourke*); 1 ♀, Papua, Popondetta, Girua Plantation, 4.i.1966 (*T. V. Bourke*); 1 ♂, Papua, Central District, Gaile Forest, 28 m. S.E. of Port Moresby, 5.v.1965 (*R. W. Crosskey*); 3 ♂, Papua, Central District, Musgrave River, 11.v.1965 (*R. W. Crosskey*); 1 ♀, Papua, Central District, Musgrave River, 18.vii.1965 (*R. W. Crosskey*); 5 ♂, 4 ♀, Papua, Central District, Kapogere, 60 m. S.E. of Port Moresby, 3.v.1965 (*R. W. Crosskey*); 92 ♂, 6 ♀, Morobe District, Wau, 3,500–4,000 ft., 14–23.v.1965 (*R. W. Crosskey*); 12 ♂, Morobe District, Nami Creek nr. Wau, 5,500 ft., 22–23.v.1965 (*R. W. Crosskey*); 4 ♂, Morobe District, Lae area, Busu River Forest, 17.vi.1965 (*R. W. Crosskey*); 1 ♂, Morobe District, Bubia, 9 m. W. of Lae, 19.vi.1965 (*R. W. Crosskey*); 3 ♂, 2 ♀, Eastern Highlands, Goroka, 26–30.v.1965 (*R. W. Crosskey*); 4 ♂, Eastern Highlands, 7 m. S.E. of Goroka, 26–27.v.1965 (*R. W. Crosskey*); 2 ♂, 2 ♀, Eastern Highlands, Fore, 30 m. S.E. of Goroka, 25.v.1965 (*R. W. Crosskey*); 23 ♂, 3 ♀, Western Highlands, Mt. Hagen, 3–7.vi.1965 (*R. W. Crosskey*); 2 ♀, Western Highlands, Olgolboly, 13 m. E. of Mt. Hagen, 4.vi.1965 (*R. W. Crosskey*). NEW BRITAIN: 30 ♂, Keravat, 25.viii.1965 (*Dept. Agric.*); 1 ♀, Rabaul, 30.vii.1937 (*J. L. Froggatt*); 15 ♂, Keravat, 25.vi–4.vii.1965 (*R. W. Crosskey*). BOUGAINVILLE: 9 ♂, 2 ♀, Numa Numa, 13–14.vii.1965 (*G. S. Dun*); 1 ♂, Sabah Plantation, 12.vii.1965 (*G. S. Dun*); 16 ♂, Arawa, 4–7 m. N. of Kieta, 11.vii.1965 (*R. W. Crosskey*); 12 ♂, Aropa area, 12 m. S. of Kieta, 8–10.vii.1965 (*R. W. Crosskey*). SOLOMON ISLANDS: 1 ♂, Guadalcanal, Mamara, 25.iv.1964 (*B. McQuillan*). QUEENSLAND: 1 ♂, 1 ♀, Gordonvale, 23.vi.1938 (*J. H. Buzacott*); 2 ♂, 3 ♀, ii.1903 [no locality data within Queensland: one of males aberrant, with only one pair of reclinate orbital setae].

All above-listed material in British Museum (Natural History).

Distribution. From Malaya and Sumatra eastwards to Queensland and the Solomon Islands: no material has been seen from Indonesia but the species must almost certainly occur there. *P. subanajama* appears to be by far the commonest species of *Palexorista* occurring in the Territory of Papua and New Guinea, including the Bismarck Archipelago and Bougainville Island.

Hosts. *Palexorista subanajama* parasitizes *Tiracola plagiata* (Walker) (Lepidoptera : Noctuidae), a pest of castor oil and tapioca, in New Guinea and Malaya. The records of *ophirica* and *inconspicuoides* as parasites of *Tiracola plagiata* published by Greenstreet & Lambourne (1933) and by Corbett & Miller (1928, 1933) are based on misidentifications of the Tachinid and actually refer to *P. subanajama* (the specimens listed above from Malaya were reared by Corbett from *T. plagiata* and are so labelled).

Other known hosts, confirmed from reared material listed above, are *Polydesma umbricola* Boisduval (Noctuidae) and *Acantholeucania loreyi* (Duponchel) in New Britain and Queensland respectively. The latter species, under the name *Cirphis loreyi*, has been recorded in the literature as host of *P. inconspicuoides* (Baranov) in Queensland by Bell (1936, 1938), but the true *inconspicuoides* is not known outside Formosa and these records almost certainly refer to *P. subanajama* (one of the species sometimes misidentified by Baranov).

Palexorista subanajama is one of the group of species showing apical spinules on the paralobes of the male hypopygium, and is one of the closely allied species with this character misidentified by Baranov as *inconspicuoides*: although closely related to this species, *subanajama* differs conspicuously in the shape of the paralobes and mesolobes of the male genitalia, in lacking black upper occipital setulae, and in the much longer antennae. Superficially *P. subanajama* is very similar to *P. solennis* but differs mainly in the large hair-patches of T4 venter, in the absence of black setulae on the upper occiput, and in the presence of spinules on the paralobes.

Palexorista solennis (Walker, 1859)

(Text-figs. 10, 23, 43, 60)

Masicera solennis Walker, 1859 : 98. Holotype ♂ [not ♀] ARU ISLANDS. In British Museum (Natural History), London. [Examined]

Tachina succini Giebel, 1862 : 319. Holotype ♀, probably ORIENTAL REGION (in copal). In Naturwissenschaftlichen Museum der Coburger Landesstiftung, Coburg. [Examined] [synonymy by Crosskey, 1966 : 134]

Meigenia latestriata Wulp, 1881 : 39. Holotype ♂, SUMATRA. In Rijksmuseum van Natuurlijke Historie, Leiden. [Examined] **syn. n.**

Crossocosmia discreta Wulp, 1893 : 164. Lectotype ♂, JAVA. In Zoölogisch Museum, Amsterdam. [Examined] **syn. n.**

Blepharipoda solennis (Walker) Austen, 1907 : 341.

Palexorista succini (Giebel) Townsend, 1921 : 134.

Prosturmia profana Townsend, 1927 : 69. Syntypes ♂, SUMATRA. In United States National Museum, Washington. [Examined] [Synonymy by Crosskey, 1966 : 134]

Sturmia inconspicuella Baranov, 1932 : 79. Lectotype ♂, FORMOSA. In Deutsches Entomologisches Institut. [Examined] **syn. n.**

Sturmia imperfecta Malloch, 1935 : 353. Holotype ♂, TONGA. In British Museum (Natural History), London. [Examined] **syn. n.**

Drino (*Prosturmia*) *inconspicuella* (Baranov) Mesnil, 1949 : 19.

Drino (*Prosturmia*) *discreta* (Wulp) Mesnil, 1951 : 181.

Palexorista discreta (Wulp) Crosskey, 1966 : 136.

Palexorista imperfecta (Malloch) Crosskey, 1966 : 136.

Palexorista inconspicuella (Baranov) Crosskey, 1966 : 136.

Palexorista latestriata (Wulp) Crosskey, 1966 : 136.

Palexorista profana (Townsend) Crosskey, 1966 : 136.

Palexorista solennis (Walker) Crosskey, 1966 : 136.

Lectotype Designations: (1) *Crossocosmia discreta* Wulp. Described from two syntypes, a male and a female, both in Amsterdam Museum, of which the male has been labelled and is here designated as LECTOTYPE. The lectotype and the female paralectotype are each labelled " Crossocosmia discreta n.s. " with the sex sign on the label and each bears a faded blue label with the words " Java Piepers " almost obliterated. (2) *Sturmia inconspicuella* Baranov. Described from an unstated number (" Sehr zahlreiche ") of male and female specimens collected by Sauter at Kankau and Sokutsu in Formosa. The type-material consists of three male syntypes and one female syntype in U.S. National Museum (from the Baranov collection) and of twenty-six male and five female syntypes in the Deutsches Entomologisches Institut: a male specimen examined from the latter collection has been labelled and is here designated as LECTOTYPE. (3) *Prosturmia profana* Townsend. Townsend based the description of *profana* on four male syntypes from Fort de Kock, and later (Townsend, 1941 : 125) stated that the " Ht " (holotype) was in Amsterdam and a " Pt " (paratype) in Washington: the statement of holotype for *profana* is not acceptable as fixation of a lectotype, since it does not restrict to a single recognizable specimen. No type-specimen of *profana* can be found in the collection of the Zoölogisch Museum, Amsterdam, and a lectotype is not designated for *profana* at this time: it should be noted however that the collection of the U.S. National Museum contains two of the original four male syntypes, but Dr. Curtis Sabrosky (personal communication) informs me that both correctly belong in Washington—neither being a specimen inadvertently not returned to Amsterdam by Townsend.

♂. Head profile as in Text-fig. 10, frontal length about 1·05 times as great as facial length, antennal axis conspicuously above ocular axis. Vertex 0·25–0·27 of head-width. Upper occiput with an irregular row of black setulae behind postocular row, setulae sometimes very sparse. Interfrontal area at least as wide as parafrontal, usually distinctly wider. Outer vertical setae undeveloped. Parafrontals from greyish or yellowish white to golden pollinose, usually pale brassy yellow pollinose; face and parafacials usually yellowish white pollinose and not noticeably contrasting with parafrontals, sometimes pale brassy yellowish or silvery whitish pollinose, if silver then more contrasting in colour with yellowish parafrontals. Parafacials narrow, slightly narrower than third antennal segment or at most subequal in width; parafacial hair conspicuous, on at least uppermost quarter and usually on uppermost third or parafacial, parafacials occasionally haired on as much as upper half or even two-thirds (as in *solennis* holotype). Antennae long, third segment 3·2–3·8 times as long as second segment (3·6 in *solennis* holotype and *inconspicuella* lectotype; 3·5 in *latestriata* holotype; 3·4 in *discreta* lectotype and *imperfecta* holotype), third segment entirely blackish brown. Palpi brown or blackish basally and yellowish or tawny brownish apically. Mesonotum with greyish to yellow pollinosity, and usually with bronze or coppery brown pollinosity around and between the black vittae, sometimes scutum extensively coppery brown pollinose; the outlining of the black vittae with coppery pollinosity forming noteworthy feature of the species. Tarsal claws long, much longer than last tarsal segment. Abdominal ground colour blackish brown, at most inconspicuously reddish laterally on T3, pollinosity greyish white or yellowish white to pale yellow (sometimes noticeably coppery around dark areas), pollinosity of intermediate tergites with shifting appearance, pale pollinose area very narrow mediallly on T3 which is largely blackish brown on median two-thirds, pollinosity of T4 on about basal half only so that posterior dark margin is unusually wide (occupying hind half of tergite). Dorsal hair of T4 in about five to nine series, fewer series in small specimens than in large ones; discal setae of T5 strong. Hair-patches of T4 venter unusually small, in some specimens patch reduced to a few hairs only, patch subtriangular and only half as long as tergite (Text-fig. 23), area of tergite basad of the hair-patch with normal surface hairing. Genitalia: aedeagus of bifurcate type, similar to that of *laxa* (Text-fig. 29); paralobes without stubby black apical spinules, few short hairs only, paralobes and mesolobes in lateral view as in Text-fig. 43; mesolobes in posterior view elongate and pointed (Text-fig. 60). Size variable, length usually about 7·5–9·5 mm., ranging from 5·1–11·5 mm. (7·1 mm. in *solennis* lectotype, 7·5 mm. in *latestriata* holotype, 8·1 mm. in *discreta* lectotype, 10·2 in *inconspicuella* lectotype, 11·5 mm. in *imperfecta* holotype).

♀. Vertex 0·28–0·31 of head-width. Third antennal segment 2·6–3·1 times as long as second segment, sometimes with reddish suffusion basally and along inner margin. Interfrontal area subequal in width to parafrontal. Parafrontals usually clear pale yellow pollinose and contrasting with white pollinose face and parafacials, parafrontals sometimes golden. Dorsal hair of T4 in about six or seven series. T4 blackish brown on about posterior two-fifths.

Puparium. Slits of posterior spiracles slightly sinuous, surface hairing of puparium short, fine and dense.

Material examined. Holotype of *solennis* ♂. ARU ISLANDS: no locality (*A. R. Wallace*). Holotype of *succini* ♀, in copal of presumed Oriental origin. Holotype of *latestriata* ♂. SUMATRA: Simau[oeng], vi.1877. Lectotype of *discreta* ♂. JAVA: no locality (*Piepers*). Syntypes of *profana*, 2 ♂. SUMATRA: Fort de Kock, 920 m., 1924 (*E. Jacobson*). Lectotype of *inconspicuella* ♂. FORMOSA: Kankau, Koshun, viii.1912 (*H. Sauter*). Holotype of *imperfecta* ♂. TONGA: Haapai, 13.ii.1925 (*Buxton & Hopkins*).

Paralectotype of *discreta* ♀. Data as for lectotype (Zool. Mus. Amsterdam). Paratype of *imperfecta* ♂. NEW BRITAIN: Rabaul (*F. H. Taylor*) (S.P.H.T.M. Sydney). Paralectotypes of *inconspicuella*, 22 ♂, 5 ♀. FORMOSA: Kankau, Koshun, iv–xi.1912 (*H. Sauter*) (D. Ent. Inst.) and 1 ♂, FORMOSA: Sokutsu, ix.1912 (*H. Sauter*) (D. Ent. Inst.).

Other material. CEYLON: 2 ♂, Peradeniya, par. of *Crocidolomia binotalis*, 18.viii.1928 (*J. C. Hutson*); 1 ♂, Trincomali, 24.ix.1890 (*Yerbury*). INDIA: 1 ♂, Bangalore, ix.1962; 1 ♂, Coimbatore, ix–x.1947 (*P. S. Nathan*); 1 ♀, Madras, Nilambur, Aravallicava, par. on *Hybloea puera*, 30.ix.1925 (*S. N. Chatterjee*); 1 ♀, Madras, Nilambur, Amarampalam R, 25.iv.1933 (*C. F. C. Beeson*); 1 ♀, Madras, Nilambur, Elenjeri, par. on *Hybloea puera*, 2–3.vii.1925 (*S. N. Chatterjee*); 1 ♀, Madras, Nilambur, par. on *Hybloea puera*, 28.v.1927 (*S. N. Chatterjee*); 1 ♀, Madras, Nilambur, Edacode, par. on *Hybloea puera*, 9.x.1925 (*S. N. Chatterjee*); 1 ♂, Poona, Akola, ex *Cosmophila* sp. on cotton, 20.viii.1963; 1 ♀, Dehra Dun, par. on *Hybloea puera*, 15.xi.1931 (*S. N. Chatterjee*); 1 ♂, 1 ♀, Central Provinces, Hoghangabad, Rahatgaon, par. on *Hybloea puera*, 2.ix. & 1.x.1926 (*S. N. Chatterjee*). BURMA: 6 ♂, 10 ♀, Zibingi, nr. Maymyo, par. on *Hybloea puera*, 13.viii.–14.ix.1930 (*D. J. Atkinson*); 1 ♂, 1 ♀, Zigon, Thitcho Reserve, 2 & 3.vii.1930 (*D. C. F.*); 1 ♂, Pyinmana, Yanaungmyin Reserve, 26.viii.1928 (*D. J. Atkinson*); 1 ♀, Pyinmana, Yanaungmyin Reserve, par. on *Hybloea puera*, 26.vii.1931 (*D. J. Atkinson*). THAILAND: 2 ♂, Bangkok, 1.i.1930 (*W. R. S. Ladell*). MALAYA: 1 ♂, Kuala Lumpur, par. on *Amathusia phidippus*, 20.xi.1922 (*G. H. Corbett & B. A. R. Gater*). SUMATRA: 1 ♂, Pematang Siantar, Naga Hoeta Estate, 1,750 ft., 20.iv.1931 (*R. I. Nel*). JAVA: 5 ♂, Tjiomas, Buitenzorg, 1.ix.1936 (*J. v. d. Vecht*) (four in Rijksmus. Leiden); 1 ♀, Mt. Gede, ex *Crocidolomia binotalis*, iii.1929 (*S. Leefmans & R. Awibowo*). SABAH: 1 ♂, Kunak, Mostyn Estate, ex oil palm bagworm, 13.vi.1966 (*E. B. Tay*). NEW GUINEA: 2 ♂, Indonesian New Guinea (West Irian), Hollandia, Kota Nica, ex *Homona*, 12.xii.1958 and 2.ii.1959 (*R. T. Simon-Thomas*) (Rijksmus. Leiden); 1 ♂, West Irian, Hollandia, Kota Nica, ex *Homona*, 13.xii.1958 (*R. T. Simon-Thomas*); 9 ♂, 2 ♀, West Irian, Kota Nica, ex *Pyr*[*austa*] *nub*[*ilalis*], 19.xii.1958–25.i.1959 (*R. T. Simon-Thomas*) (Rijksmus. Leiden except for 3 ♂ in B.M. Nat. Hist.); 2 ♀, West Irian, Kota Nica, 10.xii.1958 (*R. T. Simon-Thomas*) (Rijksmus. Leiden); 8 ♂, 2 ♀, Papua, Central District, Kapogere, 60 m. S.E. of Port Moresby, 3.v.1965 (*R. W. Crosskey*); 1 ♂, Papua, Central District, Musgrave River, 18.vii.1965 (*R. W. Crosskey*); 1 ♂, 2 ♀, Morobe District, Wau, 3,500–4,000 ft., 18–21.v.1965 (*R. W. Crosskey*); 2 ♂, 2 ♀, Morobe District, nr. Wau, Nami Creek, 5,500 ft., 22–23.v.1965 (*R. W. Crosskey*); 2 ♂, 2 ♀, Eastern Highlands, 7 m. S.E. of Goroka, 27.v.1965 (*R. W. Crosskey*); 2 ♀, Eastern Highlands, Goroka, 28–30.v.1965 (*R. W. Crosskey*);

1 ♂, 2 ♀, Western Highlands, Mt. Hagen, 3–7.vi.1965 (*R. W. Crosskey*); 3 ♂, Madang District, nr. Madang, 11–14.vi.1965 (*R. W. Crosskey*). NEW BRITAIN: 1 ♀, Keravat, 28.vi.1965 (*R. W. Crosskey*). BOUGAINVILLE: 1 ♀, Numa Numa, 13–14.vii.1965 (*G. S. Dun*). QUEENSLAND: 1 ♂, Queensland (no other data). NEW HEBRIDES: 1 ♂, Banks Islands, Vanua Lava, x.1929 (*L. E. Cheesman*); 2 ♂, Banks Islands, Santa Maria I., Gaua, Nombur, 8.x.1922 (*T. T. Barnard*); 1 ♂, Sandwich Id., 15.ix.1922 (*T. T. Barnard*); 1 ♂, Epi Island, 12.vi.1925 (*P. A. Buxton*); 2 ♂, Malekula, Ounua, ii–v.1929 (*L. E. Cheesman*); 1 ♂, Malekula, Malua Bay, vi.1929 (*L. E. Cheesman*). LOYALTY ISLANDS: 1 ♂, E. Lifu Island, Cap des Pins, 18.xi.1949–18.i.1950 (*L. E. Cheesman*). MARIANA ISLANDS: 2 ♂, 1 ♀, Saipan, Char. Kn., 20.viii.1944 (*D. G. Hall*) (U.S. Nat. Mus. except one male in B.M. Nat. Hist.); 3 ♂, Saipan, crops, 15.x.1945 (*D. G. Hall*) (U.S. Nat. Mus.); 1 ♀, Saipan, 28.viii.1951 (*R. M. Bohart*) (Bishop Mus.); 1 ♀, Saipan, As Mahetog area, at light, 5.v.1945 (*H. S. Dybas*) (Bishop Mus.); 1 ♂, Saipan, 1–2 m. E. of Tanapag, 16.iv.1945 (*H. S. Dybas*) (Bishop Mus.); 1 ♂, Rota I., 29.vii.1925 (*Hornbastel*) (Bishop Mus.); 1 ♀, Rota, 18.vi.1951 (*R. M. Bohart*) (Bishop Mus.); 3 ♂, 4 ♀, Agrihan I., 26.vii.1951 (*R. M. Bohart*) (Bishop Mus.); 1 ♂ with puparium, Tenian I. (=Tinian), 1.iii.1946 (*F. C. Hadden*) Bishop Mus.); 5 ♂, Tenian I. (=Tinian), at light, 6.iii.1946 (*F. C. Hadden*) (Bishop Mus. except one male B.M. Nat. Hist.); 3 ♀, Guam, Talofafo, 28.iv.1946 (*N. L. H. Krauss*) (Bishop. Mus.); 1 ♀, Guam, Pt. Oca, 1.vi.1945 (U.S. Nat. Mus.); 1 ♀ with puparium, Guam, Agana, ex sulphur butterfly pupa, 11.ix.1936 (*O. H. Swezey*) (Bishop Mus.); 1 ♀, Guam, Agana, 7.v.1945 (*G. E. Bohart & J. L. Gressitt*) (U.S. Nat. Mus.); 1 ♂ with puparium, Guam, Piti, ex pago leafroller, 30.xi.1936 (*O. H. Swezey*) (Bishop Mus.); 1 ♀, Guam, Tijan, 2.iv.1936 (*E. H. Bryan*) (Bishop Mus.); 1 ♂, Guam, Yigo, 8.xi.1936 (*O. H. Swezey*) (Bishop Mus.); 1 ♀ with puparium, Guam, Machanao, ex *Enchocnemidia vertumnalis*, 4.vi.1936 (*O. H. Swezey*).

The above-listed material is in British Museum (Natural History) except where otherwise stated.

Distribution. *P. solennis* is the most widely distributed species of *Palexorista* in the Oriental Region and in western Australasia. In Australia itself it is known from Queensland but not from areas further south, and in the Pacific islands occurs at least as far east as Tonga (type-locality of the synonym *imperfecta*). The species may occur in Fiji, but material seen from here (in British Museum collection), although very like *solennis*, differs in having the hair-patches of the male abdomen slightly larger and the tergite without normal hairing basad of the patches and in lacking black setulae behind the postocular row: the Fiji material may therefore belong to a distinct species, and at present the Fiji Islands represent a break in the confirmed distribution of *solennis* (to the west of Fiji *solennis* occurs in the New Hebrides and Loyalty Islands). No material of *solennis* has been seen from China during the present revision, but Mesnil (1949 : 24) has described a variety (*sinensis*) of *Drino* (*Prosturmia*) *inconspicuella* (=*Palexorista solennis*) from Shanghai which is probably conspecific with *solennis* and the range of *P. solennis* in the Oriental Region almost certainly includes southern China, and includes Formosa (the type-locality of *inconspicuella*). *P. solennis* is almost certainly common throughout Indonesia, although material has been seen only from Aru Islands and the major western islands (Sumatra, Java, Borneo); Franssen (1935) has recorded the species (under the name *inconspicuella*) from Celebes, this record almost certainly being based on a correct identification.

Hosts. Reared material of *P. solennis*, the commonest Oriental species of *Palexorista*, has been seen from the following lepidopterous hosts: *Crocidolomia binotalis* Zeller (Pyralidae : Pyraustinae) from Ceylon and Java; *Enchocnemidia vertumnalis* (Guenée) (Pyralidae : Pyraustinae) from Guam; *Ostrinia nubilalis* (Hübner) (Pyralidae : Pyraustinae) from Indonesian New Guinea; *Homona* sp. (Tortricidae) from Indonesian New Guinea; *Cosmophila* sp. (Noctuidae) from India; *Hyblaea puera* (Cramer) (Noctuidae) from India and Burma; and *Amathusia phidippus* (Linnaeus) (Amathusiidae) from Malaya. Wulp (1893) recorded that the type-material of *discreta* (=*solennis*) was reared from *Godara comalis* (Guenée); this name is synonymous with *Crocidolomia binotalis* Zeller.

The specimen of *P. solennis* listed above as reared from *Amathusia phidippus* (L.) in Malaya was misidentified when first collected as the European species *P. inconspicua* (Meigen), and is the basis of the erroneous records of Corbett & Miller (1928, 1933) of *inconspicua* as a parasite of this host.

The host records for *Sturmia inconspicuella* (=*Palexorista solennis*) in the economic literature for which material has not been seen fall into two groups, those that are almost certainly valid and based on correct determination of the tachinid parasite and those that are suspect through probable misidentification: the host records of *Agrotis* (as *Rhyacia*) *ipsilon* (Hufnagel) in Celebes by Franssen (1935), of *Acantholeucania* (as *Cirphis*) *loreyi* (Duponchel) in Queensland by Bell (1939), of *Pyrausta* (as *Hapalia*) *machoeralis* (Walker) in India by Beeson & Chatterjee (1935), of *Margaronia laticostalis* (Guenée) in India by Beeson & Chatterjee (1935) and of *Spodoptera mauritia* (Boisduval) in India by Beeson & Chatterjee (1935) are probably all correct; those of *Telicota palmarum* Moore (=*Cephrenes augiades* (Felder)) in Malaya by Corbett & Miller (1933) and of *Spodoptera* (as *Prodenia*) *litura* (Fab.) in Fiji by Lever (1943) are suspect.

P. solennis is one of the most distinctive species in the Oriental Region, at once distinguishable in the male from other species of *Palexorista* by the exceptionally small hair-patches of T4 and the presence of normal tergite hairing basad of the patches; apart from *P. laxa*, this species is the only one with bifurcate aedeagus in the Oriental Region in which the paralobes lack apical spinules. The absence of spinules from the paralobes assists in distinguishing *solennis* from *P. subanajama* (Townsend) and *P. aequalis* (Malloch), both of which have a close superficial resemblance except for the larger hair-patches; *P. aequalis* (Malloch) from Samoa is not discussed in the present paper as it does not occur in the Oriental Region, but Text-fig. 39 shows the hypopygium of *aequalis* for comparison with that of *solennis* (the shape of the paralobes and mesolobes is very similar but the former show the conspicuous spinules in *aequalis*). Mesnil (1949, 1951) suggested the possibility that *P. subanajama* was a synonym of *inconspicuella* = *discreta* (both here synonymized with *solennis*), but examination of the lectotype of *subanajama* shows that the species are quite distinct.

Mesnil (1949) described *Drino* (*Prosturmia*) *inconspicuella* var. *sinensis* from China, later (Mesnil, 1951) citing it as a variety of *discreta* (senior synonym of *inconspicuella*): no material has been seen of var. *sinensis*, but the exceptionally small male abdominal hair-patches mentioned in the description suggest that it is not specifically distinct from *solennis*.

It should be noted that in my earlier paper (Crosskey, 1966) on *Palexorista* I inadvertently cited the type-locality of *imperfecta* (described by Malloch in *Insects of Samoa*) as Samoa; Tonga is the correct locality.

Palexorista laxa (Curran, 1927)

(Text-figs. 11, 29, 61)

Sturmia laxa Curran, 1927 : 335. Holotype ♂, TANZANIA. In British Museum (Natural History), London. [Examined]

Palexorista laxa (Curran) Crosskey, 1966 : 136.

♂. Head profile as in Text-fig. 11, frontal length about 1·11 times as great as facial length, antennal axis conspicuously above ocular axis. Vertex 0·32–0·34 of head-width (0·32 in holotype), frons unusually and conspicuously broad. Upper occiput without black setulae behind postocular row. Interfrontal area subequal in width to a parafrontal. Outer vertical setae undeveloped. Parafrontals greyish white or yellowish white to pale greyish yellow pollinose, colour not noticeably contrasting with white pollinose face and parafacials. Parafacials unusually broad, distinctly wider than third antennal segment, haired on uppermost third or two-fifths or sometimes on as much as upper half. Antennae long, third segment 2·6–3·0 times as long as second segment and entirely blackish brown or at most with a trace of orange at junction with second segment. Palpi blackish brown basally and tawny yellowish apically. Mesonotum with pale yellowish grey to pale yellow pollinosity. Tarsal claws long. Abdominal ground colour blackish brown, faintly reddish on sides of T3, pollinosity very pale yellowish and with strong shifting appearance on intermediate tergites, dark hind border of T4 occupying about one-third of tergite length. Dorsal hair of T4 in about six or seven series, discal setae of T5 strong. Hair-patches of T4 venter large, similar to those of *curvipalpis* (Text-fig. 28) or slightly larger. Genitalia: aedeagus of bifurcate type, shaped as in Text-fig. 29; paralobes haired only, no stubby black apical spinules, paralobes and mesolobes in lateral view shaped as in Text-fig. 44; mesolobes in posterior view elongate and pointed (Text-fig. 61). Length usually about 8–9 mm., ranging from 6·9 to 10·2 mm. in material seen.

♀. Vertex 0·35–0·37 of head-width. Third antennal segment 2·2–2·5 times as long as second segment, latter sometimes reddish. Interfrontal area subequal in width to or slightly narrower than parafrontal, seen from in front with thin whitish pollinosity so that whole frons appears rather greyish white in some lights; parafrontals at most only faintly yellowish. Lower pair of reclinate orbital setae much smaller than upper pair, size differential more conspicuous than in most species. Dorsal hair of T4 in about six or seven series, black margin of T4 occupying only about posterior quarter of tergite.

Puparium: slits of posterior spiracles almost straight or with slight simple curvature, surface hairs not spiniform.

Material examined. Holotype ♂ with puparium. TANZANIA: Tanganyika, Morogoro, ex *Chloridea obsoleta*, vii.1923 (*A. H. Ritchie*).

Paratypes. TANZANIA: 2 ♀, one with puparium, data as for holotype (B.M. Nat. Hist.); 1 ♀, Kimamba, parasite of maize leaf caterpillars (*A. H. Ritchie*) (B.M. Nat. Hist.).

Other material. TANZANIA: 1 ♂, 1 ♀, Ilonga, Kilosa, ex *H. armigera* on maize, 27.iv.1950 (*H. J. Disney*); 1 ♂, 1 ♀, Ilonga, ex *H. armigera* on cotton, 3 and 5.vi.1949

(*H. J. Disney*); 1 ♀, Msowero, ex *H. armigera* on cotton, 12.vii.1949 (*H. J. Disney*); 10 ♂, 9 ♀, Ilonga, ex *H. armigera*, 25.iv.–23.vii.1962 (*I. A. D. Robertson*); 5 ♂, 1 ♀, with puparia, Ukiriguru, ex *H. armigera* on cotton, 22.v.–3.vii.1961 (*I. A. D. Robertson*); 2 ♂, Ukiriguru, ex *Heliothis armigera* larva, v.1962 (*W. Reed*). UGANDA: 1 ♀, Masindi, em. from cocoon, 10.viii.1923 (*H. Wilkinson*). MALAWI: 1 ♀, Nyasaland, Ntonowe, ex caterpillars, 30.i.1923 (*C. Smee*). RHODESIA: 1 ♂, 2 ♀, with puparia, Mazoe, ex *Heliothis armigera*, 5 and 12.xi.1938 (*E. Parry-Jones*). SOUTH AFRICA: 2 ♀, Zeekoevlei, ex *Heliothis armigera*, 10.xi.1951 (*H. W. Bedford*); 1 ♀, Natal, Richmond, 30.v.1937 (*W. F. Jepson*). SUDAN: 1 ♂, Tokar, 21.x.1912 (*H. H. King*). INDIA: 1 ♂, 1 ♀, Madhya Pradesh, Pipariya.

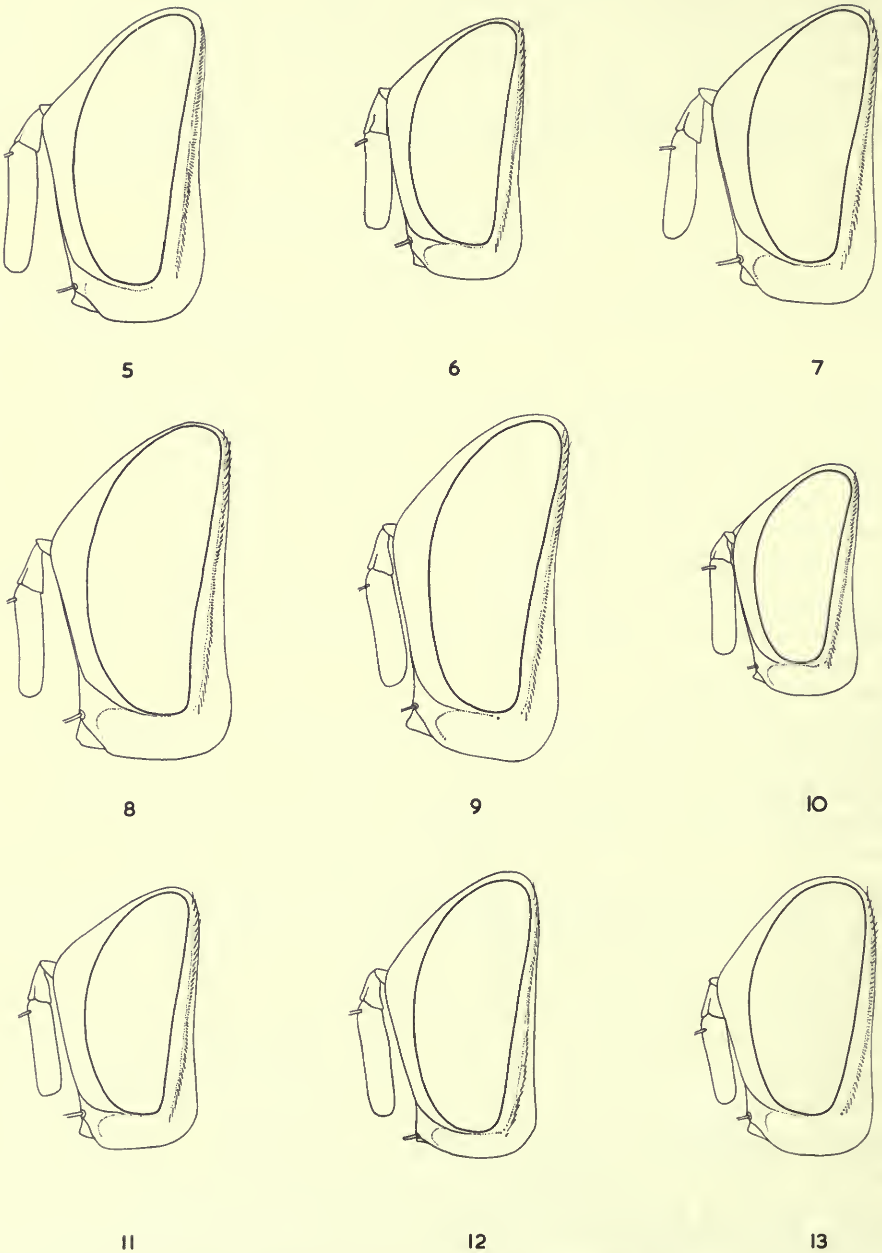
All above-listed material in British Museum (Natural History).

Distribution. *Palexorista laxa* is widespread and probably common throughout eastern Africa from South Africa to the Sudan; until recently it was not known from the Oriental Region, but it can now be established that it occurs in India. Reared material, ex *Heliothis* from India, currently in culture in Georgia, U.S.A., is indistinguishable in male genitalia and all other characters from the holotype and other material of *P. laxa* (Curran) reared from *Heliothis* in Africa. As yet no records exist of *laxa* from anywhere between eastern Africa and India, but the species almost certainly occurs in the intervening area (the British Museum collection contains specimens of the very closely related species *Palexorista zonata* (Curran) from Arabia and of an undescribed species of *Palexorista* from Aden). *P. laxa* is the only species of the genus, other than *P. parachrysops*, that is known to occur in both Ethiopian and Oriental Regions. It is not yet known from Egypt (although it may well occur there), but the closely allied species *P. imberbis* (Wiedemann) occurs there and elsewhere in the Middle East.

Hosts. The only authenticated host of *P. laxa* is the Old World Cotton Bollworm, *Heliothis armigera* (Hübner) (Lepidoptera : Noctuidae), a widespread pest of cotton and of maize and other cereal crops in Africa, southern and eastern Asia, Queensland and the western Pacific; material of *P. laxa* reared from this host has been seen from Tanzania, Rhodesia, South Africa and India during the preparation of this paper. The holotype of *laxa* was reared from *H. armigera*, but is labelled ex *Chloridea obsoleta*; for many years *armigera* was referred to in the Old World economic literature as *obsoleta* Fab., but this name applies to the New World Cotton Bollworm, *Heliothis zea* (Boddie).

Curran (1927) recorded that one of the female paratypes of *Sturmia laxa* was bred from *Laphygma* (=*Spodoptera*) *exempta* Walker (Noctuidae). This paratype has not been seen and I do not know its whereabouts, but it appears likely that it was not correctly associated with the male holotype and this host record must be regarded as suspect. Similarly, no material has been seen on which the record of *laxa* as a parasite on *Cirphis* (=*Acantholeucania*) *loreyi* Duponchel could be based (Jack, 1935 : 564) and the record cannot be substantiated at present. Thus *Heliothis armigera* is the only proven host of *Palexorista laxa*, and, it may be noted, *laxa* is the only species of *Palexorista* certainly known to parasitize the Old World Cotton Bollworm.

Mesnil (1949, 1951) treated *laxa* as a synonym of *Drino* (*Prosturmia*) *imberbis*



FIGS. 5–13. Outline head profile of male of: 5, *P. subanajama*, lectotype; 6, *P. lucagus*; 7, *P. munda*; 8, *P. inconspicuoides*, lectotype; 9, *P. laetifica*, holotype; 10, *P. solennis*, holotype; 11, *P. laxa*, holotype; 12, *P. reclinata*, paratype; 13, *P. bisetosa*, holotype.

(Wiedemann), a species described from Egypt. It has not been possible to see any type-material of *imberbis* (see fuller discussion of this species in a later section), but presuming this species as currently understood to be correctly identified there appears to be no doubt that *laxa* and *imberbis* are distinct species, and the synonymy established by Mesnil is here not accepted. Both species are undoubtedly very closely allied, and both have an exceptionally wide frons, but the male genitalia differ considerably in the shape of the paralobes and mesolobes; the differences are discussed in more detail later in this paper. The lack of spinules on the paralobes is unusual in species of *Palexorista* in which the aedeagus is of the bifurcate type, and the only other species occurring in the Oriental Region with bifurcate aedeagus but lacking such spinules is *P. solennis*: *laxa* is easily distinguished from *solennis* by the large hair-patches of the male abdomen and by the absence of black occipital setulae. The very wide frons and paralobes without spinules will distinguish *laxa* from *P. munda*, a generally similar species in southern India.

Palexorista dilaticornis (Mesnil, 1951)

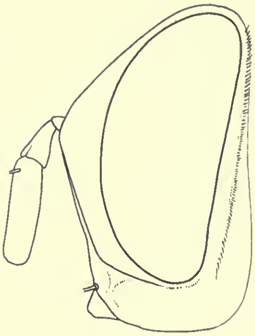
Drino (*Prosturmia*) *dilaticornis* Mesnil, 1951 : 179. Holotype ♂, INDIA (probably lost, see below).
Palexorista dilaticornis (Mesnil) Crosskey, 1966 : 135.

Note. Dr. Mesnil informs me that the male holotype of *dilaticornis* was returned to the British Museum (Natural History) after description, but it cannot now be found in the British Museum collection and is not by chance still in Dr. Mesnil's collection; it must be considered probably lost. No other material of the male sex is known and the description of the male given below is based on characters mentioned in the original description. Both sexes were described by Mesnil, and a female paratype is in the British Museum; data of this specimen were not cited in the original description but are given below.

♂. Antennal axis far above ocular axis. Vertex about 0·25 of head-width (deduced from statement " Stirn so breit wie 2/3 eines Auges von oben gesehen " in original description). Upper occiput with an irregular row of black setulae behind postocular row. Interfrontal area slightly narrower than a parafrontal. Outer vertical setae hair-like. Parafrontals pale yellowish pollinose, face and parafacials thickly whitish pollinose. Parafacials at mid height subequal in width to third antennal segment, haired on about upper half. Antennae long and unusually heavy, third segment about 2·5–3·0 times as long as second segment and entirely blackish brown. Palpi blackish brown basally and yellowish apically. Mesonotum with ashy grey to yellowish grey pollinosity, species with mainly greyish appearance. Tarsal claws long. Abdomen with mainly dark ground colour but yellowish laterally on T3 and T4, pollinosity mainly ashy grey, dorsum with very distinct dark median line widest on T3, T4 pollinose on basal half and blackish hind margin occupying about posterior half of tergite. Discal setae of T5 strong. Hair-patches of T4 venter rather small and rounded, only about half the width of one half-tergite. [Genitalia not described or figured by Mesnil, aedeagus probably of bifurcate type]. Length presumed about 6 mm. [original description states 6–8 mm. for type-material and available ♀ paratype measures 8·1 mm.]

♀. Vertex 0·33 of head-width. Third antennal segment 3·6 times as long as second segment. Head pollinosity all greyish white. Interfrontal little narrower than parafrontal. Dorsal hair of T4 in about six or seven series.

Material examined. Paratype ♀. INDIA: S. Coorg, Tithimatti, par. on Geometridae, 14.x.1940 (*B. M. Bhatia*) (B.M. Nat. Hist.).



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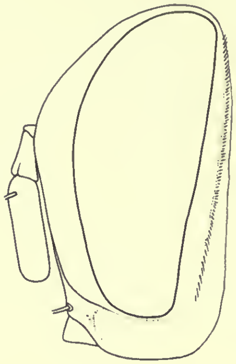

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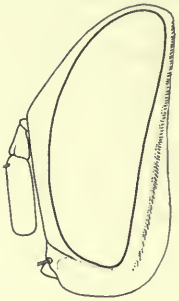

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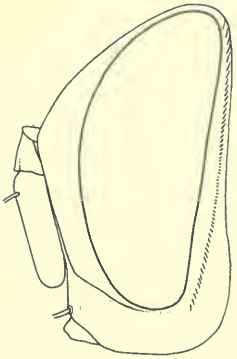

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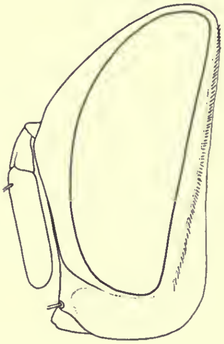

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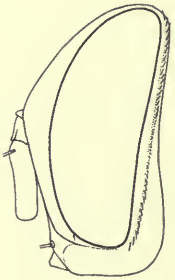

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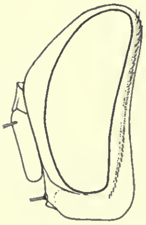

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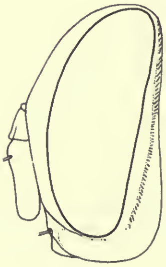

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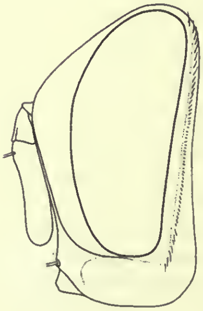

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FIGS. 14–22. Outline head profile of male of: 14, *P. ophirica*, paralectotype; 15, *P. curvipalpis*, lectotype; 16, *P. deducens*, lectotype; 17, *P. immersa*, from paralectotype of *latiforceps*; 18, *P. summaria*, paralectotype; 19, *P. painei*, lectotype; 20, *P. parachrysops*; 21, *P. sororcula*, holotype; 22, *P. bancrofti*, holotype.

Distribution. Known only from southern India.
Hosts. The type-material was reared from the larva of an unidentified species of Geometridae (Lepidoptera).

The loss of the holotype and the absence of other male specimens make it impossible to determine the affinities of *P. dilaticornis*; there is a superficial resemblance of the female to *P. immersa* (Walker) and Mesnil (1951 : 159) runs *dilaticornis* out in the same key-couplet as *latiforceps* Baranov (of which *immersa* is senior synonym). It is not impossible that *dilaticornis* is the same as *P. summaria* (Townsend), of which the female has not been seen but the male of which has rather small rounded abdominal hair-patches fitting Mesnil's description of *dilaticornis*; on the other hand, the ocular axis being well below the antennal axis suggests affinity with forms having the bifurcate type of aedeagus.

Palexorista bisetosa (Baranov, 1932)

(Text-fig. 13)

Sturmia bisetosa Baranov, 1932 : 75. Holotype ♂, FORMOSA. In Deutsches Entomologisches Institut. [Examined]
Drino (*Prosturmia*) *bisetosa* (Baranov) Mesnil, 1949 : 21.
Palexorista bisetosa (Baranov) Crosskey, 1966 : 135.

♂ [holotype]. Head profile as in Text-fig. 13, frontal length about 1·27 times as great as facial length, antennal axis almost level with ocular axis. Vertex 0·31 of head-width. Upper occiput with a row of black setulae behind postocular row. Interfrontal area slightly wider than parafrontal. Outer vertical setae strongly developed [setae themselves missing on holotype but large pores conspicuous]. Parafrontals yellowish white, colour not noticeably contrasting with creamy whitish pollinose face and parafacials. Parafacials very slightly wider than third antennal segment, with only very few small hairs on about uppermost quarter. Antennae short, third segment 2·3 times as long as second segment and entirely blackish brown. Palpi mostly dark brown, only tawny yellowish on tips. Mesonotum rather greased in holotype but pollinosity apparently mostly pale greyish with little or no trace of a yellow tinge. Tarsal claws very short, much shorter than fifth tarsal segment. Abdomen with mainly dark ground colour but with pale reddish tinge antero-laterally, pollinosity very pale greyish yellow, T4 dark on about posterior quarter. Dorsal hair of T4 in about six series; discal setae of T5 strong. Hair-patches of venter of T4 very large, each occupying almost three-quarters of width of one side of T4 venter. [Genitalia missing from holotype: see discussion]. Length 8·2 mm.
♀. Unknown.

Material examined. Holotype ♂. FORMOSA: Sokutsu, ix.1912 (*H. Sauter*).
Distribution. Known only from Formosa.
Hosts. Unknown.

P. bisetosa is still known only from the male holotype, the genitalia of which appear to be lost: they were probably slide-mounted by Baranov, following his normal practice, but the slide cannot now be found in the collection of the Deutsches Entomologisches Institut or in the Baranov collection now at U.S. National Museum. From Baranov's (1932) figure of the lateral view of the hypopygium it is clear that the aedeagus of *bisetosa* is of the non-bifurcate type and that the paralobes and mesolobes in profile are long, slender and pointed: the figure suggests a similarity to *P. curvipalpis* (Wulp), and it is probable that *P. bisetosa* is more closely related to this species than to others of the genus (it resembles *curvipalpis* also in the short antennae and rather wide frons). The presence of strong outer vertical setae distinguishes *bisetosa* (presuming this character of the holotype holds generally for the species) from all other Oriental species of *Palexorista*, and together with the very short male claws, makes *bisetosa* a distinctive species.

Palexorista curvipalpis (Wulp, 1893)

(Text-figs. 15, 28, 46, 63)

Crossocosmia curvipalpis Wulp, 1893 : 162. Lectotype ♂, JAVA. In Zoölogisch Museum, Amsterdam. [Examined]

Sturmia unisetosa Baranov, 1932 : 75. Lectotype ♂, FORMOSA. In Deutsches Entomologisches Institut. [Examined] **syn. n.**

Drino (*Prosturmia*) *unisetosa* (Baranov) Mesnil, 1949 : 28.

Palexorista curvipalpis (Wulp) Crosskey, 1966 : 135.

Palexorista unisetosa (Baranov) Crosskey, 1966 : 136.

Lectotype Designations: (1) *Crossocosmia curvipalpis* Wulp. This was described from three syntypes, probably all male; Wulp, at the heading of the specific description, gave the sex as " ♂ ? " but in the same paper gave the sex as male without doubt in the list of figures (the head in lateral view shown in plate 4, figure 3a is of a male). A male specimen seen from Amsterdam Museum bears the label " Crossocosmia curvipalpis ♂ " in Wulp's writing and a faded square blue label reading " Java Piepers " and is undoubtedly an original syntype: this specimen has been labelled and is here designated as LECTOTYPE. A female specimen in the Amsterdam collection is labelled " Crossocosmia curvipalpis ♀ " in Wulp's writing and also bears a " Java Piepers " label, but both labels are less faded than those on the male: there is no evidence from Wulp's description that he had a female specimen before him at the time of description, and the female is here considered not to be part of the original syntypic series. It should also be noted that the female specimen was misidentified by Wulp, and is not conspecific with the male lectotype of *curvipalpis*: its identity is uncertain, but it belongs to one of the species in which there is a row of black setulae on the upper occiput (absent in *curvipalpis*). (2) *Sturmia unisetosa* Baranov. Type-material consists of three conspecific male syntypes from Kankau, Formosa, one in U.S. National Museum and two in Deutsches Entomologisches Institut (one of which has been labelled and is here designated as LECTOTYPE).

♂. Head profile as in Text-fig. 15, frontal length about 1·23 times as great as facial length, antennal axis only a little above ocular axis. Vertex usually 0·27–0·29 of head-width, in specimens seen from Queensland upper frons very wide and vertex 0·30–0·33 of head-width. Frons usually rather strongly convex, rows of frontal setae with tendency to be doubled. Upper occiput entirely without black setulae behind postocular row. Interfrontal area narrower than or subequal in width to parafrontal. Outer vertical setae undeveloped. Parafrontal hair dense and very fine. Parafrontals and facial regions concolorous silvery or greyish white pollinose, at most only faintly yellowish, the rather uniformly whitish head pollinosity forming characteristic feature of the species. Parafacials broad, distinctly wider than third antennal segment; parafacials nearly bare and often appearing so at first glance, usually with only a very few minute hairs immediately below lowest frontal seta, at most haired only on uppermost fifth and usually on less. Antennae short, third segment 2·1–2·4 times as long as second segment, third segment usually almost entirely blackish brown but sometimes with orange or reddish suffusion basally. Palpi brown to blackish brown with tawny yellow or pale brownish tips. Mesonotum pale grey or greyish yellow pollinose, more distinctly yellow pollinose in specimens seen from New Guinea and Bougainville. Tarsal claws long. Abdominal ground colour largely blackish brown, sometimes a little reddish on sides of T3, pollinosity greyish or yellowish white to pale yellow with slightly shifting appearance on intermediate tergites, dark hind margin of T4 occupying about posterior third or two-fifths of tergite. Dorsal hair of T4 in about six to nine or ten series, usually fewer series in smaller specimens; discal setae of T5 strong. Hair-patches of T4 venter large, as in Text-fig. 28. Genitalia: aedeagus of non-bifurcate type; paralobes without apical spinules, paralobes and mesolobes in lateral view as in Text-fig. 46; mesolobes in posterior view with acuminate apices (Text-fig. 63). Length variable, usually about 8–10·5 mm., ranging from 7–12 mm. with exceptional bred specimens seen from Thailand as small as 5 mm., 10·2 mm. for lectotype of *unisetosa* and 11·1 mm. for lectotype of *curvipalpis*.

♀. Vertex 0·30–0·31 of head-width, 0·34 in specimen seen from Queensland. Third antennal segment 2·2–2·4 times as long as second segment. Interfrontal area noticeably narrower than parafrontal. Parafrontals strikingly silvery white pollinose like facial regions. Upper occiput sometimes with a very few haphazard black setulae. Dorsal hair of T4 in about five or six series.

Puparium: slits of posterior spiracles not or only slightly sinuous, surface hairs not at all spiniform.

Material examined. Lectotype of *curvipalpis* ♂. JAVA: no locality (*Piepers*). Lectotype of *unisetosa* ♂. FORMOSA: Kankau, Koshun, 7.viii.1912 (*H. Sauter*), bearing erroneous determination label reading " Phorcida idonea B.B. L. Mesnil det.".

Paralectotype ♂ of *unisetosa*. FORMOSA: Kankau, Koshun, 7.ix.1912 (*H. Sauter*) (D. Ent. Inst.).

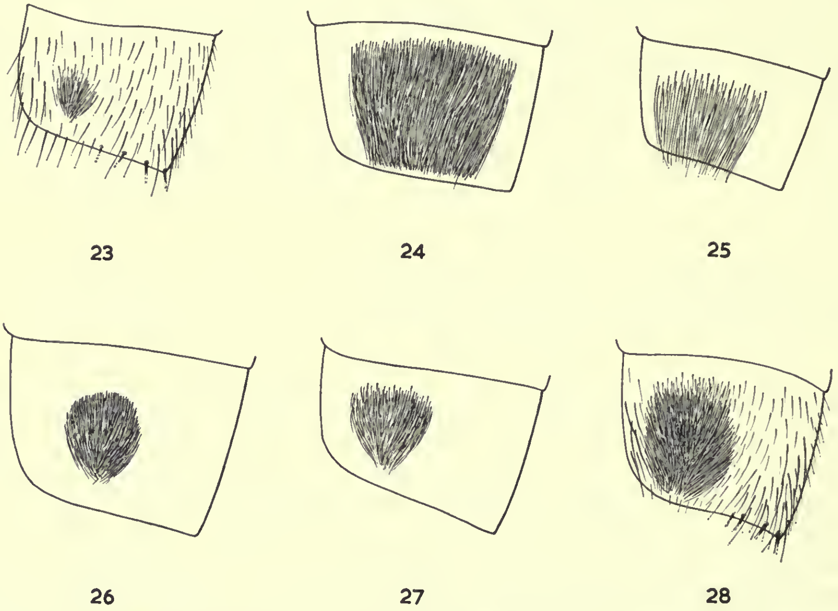
Other material. CEYLON: 1 ♂, 6 ♀, Peradeniya, ex Sphingid, 2.ii.1926 (*J. C. Hutson*); 1 ♂ with puparium, Suduganga, bred from *Suana concolor*, 21.vi.1922 (*R. Senior White*); 1 ♂, Trincomali, 9.x.1890 (*Yerbury*). THAILAND: 2 ♂, 2 ♀, Siam, Bangkok, 1947 (*C. Tongyai*). JAVA: 1 ♂, Buitenzorg, 1921 (Rijksmuseum Leiden). CELEBES: 2 ♂, Minahassa, 27.vi.1954 (*A. H. G. Alston*); 1 ♂, Minahassa, Makawidei, 23–24.vi.1954 (*A. H. G. Alston*); 1 ♂, Molino, 4,000 ft., i.1936 (*L. E. Cheesman*). NEW GUINEA: 1 ♂, Papua, Northern District, Popondetta, Papuan Agricultural Training Institute, 10.i.1966 (*S. Ino & B. Kearo*); 1 ♂, Morobe District, Wau, 3,500–4,000 ft., 14.v.1965 (*R. W. Crosskey*); 1 ♂, Morobe District, nr Wau, Nami Creek, 5,500 ft., 22.v.1965 (*R. W. Crosskey*). NEW BRITAIN: 1 ♂, Keravat, ex larva *Hippotion celerio*, 4.i.1941 (*J. L. Froggatt*). BOUGAINVILLE: 1 ♂, 1 ♀, Aropa area, 12 m. S. of Kieta, 8–10.vii.1965 (*R. W. Crosskey*); 1 ♀, Arawa, 4–7 m. N. of Kieta, 8–9.vii.1965 (*R. W. Crosskey*). SOLOMON ISLANDS: 1 ♀, Santa Cruz group, Utupua Island, vi.1933 (*R. J. A. W. Lever*). QUEENSLAND: 1 ♂, Biloela, 1.iii.1932, on Sphingid (*D. O. Atherton*); 1 ♂, North Queensland, Stannary Hills, c. 3,000 ft. (*T. L. Bancroft*); 11 ♂, 2 ♀, no locality, ii.1903.

All foregoing material in British Museum (Natural History) except where otherwise indicated.

Distribution. Evidently a widespread species from Ceylon through south-east Asia to New Guinea, Queensland and the Solomon Islands and probably commoner than the few records suggest.

Hosts. *P. curvipalpis* has been reared from *Hippotion celerio* (Linnaeus) (Lepidoptera : Sphingidae) in New Britain and from unidentified Sphingids in Ceylon and Queensland; one specimen has been seen bred from *Suana concolor* (Walker) (Lepidoptera : Lasiocampidae) in Ceylon.

Wulp (1893), in the original description of *Crossocosmia curvipalpis*, recorded the host of the type-material as *Hypaetra remosa* Hbn.: Lepidoptera specialists in British Museum (Natural History) have been unable to trace a *remosa* of Huebner under this or a similar spelling, and the identity of the host recorded by Wulp is enigmatic.



Figs. 23–28. Showing hair-patch of one side of venter of T4 in male of: 23, *P. solennis*; 24, *P. lucagus*; 25, *P. parachrysops*; 26, *P. summaria*; 27, *P. painei*; 28, *P. curvipalpis*. Ordinary hairing of tergite and bases of marginal setae omitted in figs. 24–27. Hair-patch in male of species not illustrated is generally similar to that of *curvipalpis* 28, or slightly larger.

Mesnil (1951 : 162) suggested the possible synonymy of *curvipalpis* with *Drino argenticeps* (Macquart), but present examination of the lectotype of *curvipalpis* does not confirm this; *curvipalpis* is without doubt an older name for *unisetosa* Baranov and a valid species of *Palexorista* Townsend.

Palexorista ophirica (Walker, 1857)

(Text-figs. 14, 47, 64)

Tachina ophirica Walker, 1857 : 19. Lectotype ♂, Malaya. In British Museum (Natural History), London. [Examined]

Blepharipoda ophirica (Walker) Austen, 1907 : 340.

Palexorista ophirica (Walker) Crosskey, 1966 : 136.

Lectotype Designation: the type-material is male, not female as stated in error by Walker, and consists of two conspecific male syntypes from Mt. Ophir. One of the syntypes has been labelled and is here designated as LECTOTYPE.

♂. Head profile as in Text-fig. 14, frontal length about 1·30 times as great as facial length, profrons rather prominent, antennal axis distinctly above ocular axis. Vertex 0·26–0·28 of head-width. Upper occiput with an irregular row of black setulae behind postocular row. Interfrontal area subequal in width to parafrontal. Parafrontals pale yellowish grey or very pale yellow pollinose, not noticeably contrasting with greyish or silvery white or creamy whitish pollinose face and parafacials. Parafacial at mid height slightly wider than third antennal segment, parafacials slightly more receding than in most species and rather conspicuously haired on uppermost third or upper half. Antennae of medium length, third segment 2·3–2·4 times as long as second segment and entirely blackish brown. Palpi mainly yellowish brown or darker brown basally. Mesonotum pale yellowish grey pollinose, sometimes more distinctly pale yellowish pollinose especially near scutellum. Tarsal claws long, longer than last tarsal segment. Abdomen mainly dark in ground colour but with a trace of reddish or tawny orange ground colour antero-laterally with yellowish white or greyish white pollinosity with rather shifting appearance on intermediate tergites, these appearing black to naked eye on about posterior half. Hair of tergites rather fine and abundant, hair of T4 in about nine to eleven series; discal setae of T5 strong. Hair-patches of T4 venter large, similar to those of *curvipalpis* (Text-fig. 28). Genitalia: aedeagus of non-bifurcate type, similar to that of *immersa* (Text-fig. 35); paralobes without spinules, paralobes and mesolobes rather long and in profile as in Text-fig. 47; mesolobes subtruncate in posterior view (Text-fig. 64). Length about 9–11 mm.

♀. Unknown.

Material examined. Lectotype ♂. MALAYA: Malacca, Mt. Ophir, 4,000 ft. (*A. R. Wallace*).

Paralectotype ♂. Data as for lectotype (B.M. Nat. Hist.).

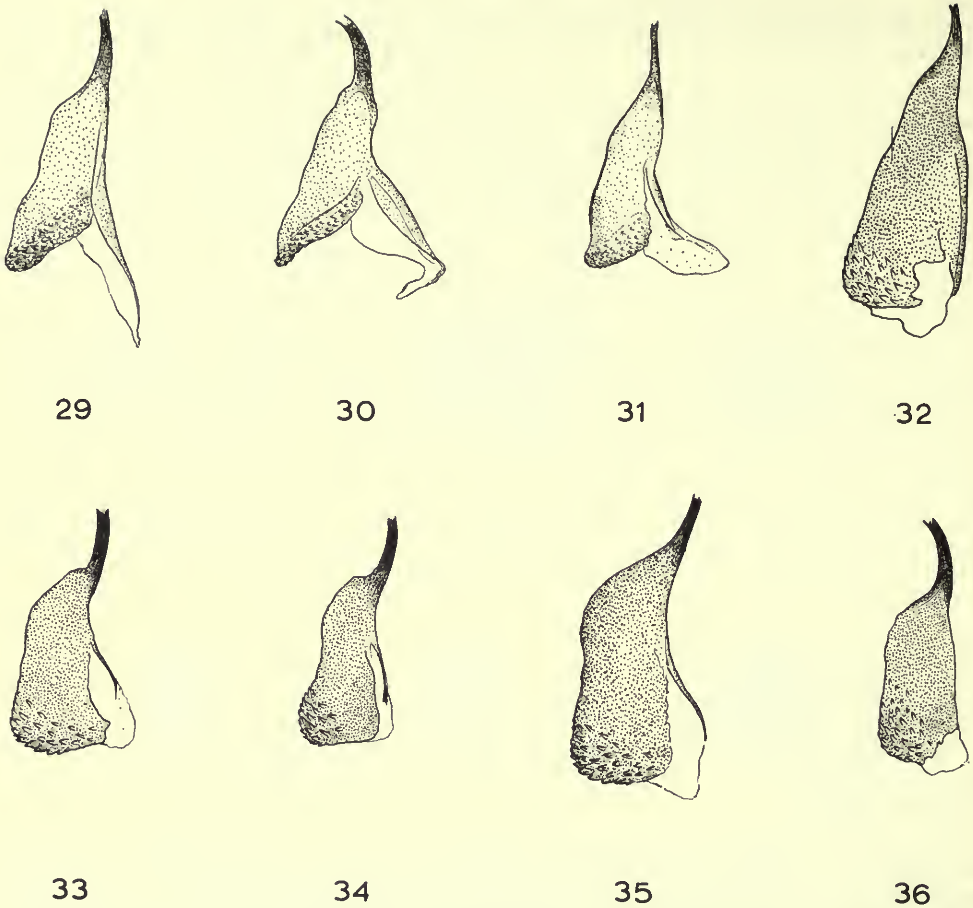
Other material. MALAYA: 1 ♂, Serdang, 5.i.1933 (*G. H. Corbett*) (B.M. Nat. Hist.). INDONESIA: 2 ♂, West Java, Mt. Gede, Lebak Sive, 5,000 ft., ix.1937 (B.M. Nat. Hist.).

Distribution. Known only from Malaya and Java. The specimens from Java listed above differ slightly from the type-material in having rather finer but shorter and denser hair on the mesonotum and abdomen, but it appears best to regard them as conspecific with the type-material from Malaya on present evidence.

Hosts. The Malayan specimen listed above from Serdang and collected by Corbett was reared from *Hulodes caranea* (Cramer) (Lepidoptera : Noctuidae), and is the basis of an erroneous record by Corbett & Miller (1933 : 11) of this noctuid as host of *Sturmia inconspicuoides* (the specimen bears an incorrect determination label of Baranov identifying it as *inconspicuoides*).

The record of *ophirica* as a parasite on *Tiracola plagiata* (Walker) in Malaya by Corbett & Miller (1928 : 417), again recorded by Greenstreet & Lambourne (1933 : 43), is in error and due to misidentification of the species of *Palexorista* involved (see under the " Hosts " section for *P. subanajama*). At present *Hulodes caranea* is the only established host for the true *P. ophirica*.

The affinities of *Palexorista ophirica* appear to be most closely with *P. immersa* and *P. summaria*, to judge from the male hypopygium, all three species having the unusually truncate mesolobes (in posterior view); the head profile is distinctly different, however, from these two species and *ophirica* is certainlv more distinct from either than *immersa* and *summaria* are from each other.



Figs. 29–36. Apex of male aedeagus of: 29, *P. laxa*; 30, *P. inconspicuoides*; 31, *P. lucagus*; 32, *P. sororcula*; 33, *P. summaria*; 34, *P. immersa*; 35, *P. deducens*; 36, *P. painei*. Figs. 29–31 illustrate the " bifurcate " type of aedeagus, and figs. 32–36 the "non-bifurcate " type.

Palexorista immersa (Walker, 1860)

(Text-figs. 17, 34, 49, 65)

Masicera immersa Walker, 1860 : 124. Holotype ♂ [not ♀], Celebes. In British Museum (Natural History), London. [Examined]

Blepharipoda immersa (Walker) Austen, 1907 : 340.

Sturmia latiforceps Baranov, 1932 : 78. Lectotype ♂, Formosa. In Deutsches Entomologisches Institut. [Examined] **syn. n.**

Drino (*Prosturmia*) *latiforceps* (Baranov) Mesnil, 1949 : 21.

Palexorista immersa (Walker) Crosskey, 1966 : 136.

Palexorista latiforceps (Baranov) Crosskey, 1966 : 136.

Lectotype Designation: the type-material of *Sturmia latiforceps* Baranov consists of twelve conspecific male syntypes from Formosa, two in U.S. National Museum, one in British Museum (Natural History), and nine in Deutsches Entomologisches Institut (of which one has been labelled and is here designated as LECTOTYPE): Baranov mentioned 13 males in the original description, but the whereabouts of one of these has not been traced. It should be noted that most of the syntypes lack the abdomen or male hypopygium, and that no slide mounts of the genitalia appear to exist either in Deutsches Entomologisches Institut collection or with the Baranov collection in Washington.

♂. Head profile as in Text-fig. 17, frontal length about 1·30 times as great as facial length, antennal axis only very slightly above ocular axis. Vertex 0·28–0·30 of head-width (0·29 in *immersa* holotype and *latiforceps* lectotype). Upper occiput with an irregular row of black setulae behind postocular row, sometimes sparse or even represented by only one or two haphazard setulae. Interfrontal area subequal to or slightly narrower than parafrontal. Outer vertical setae undeveloped. Parafrontals greyish white (as in *immersa* holotype and *latiforceps* lectotype) to pale yellowish grey pollinose and not contrasting with white pollinose face and parafacials, in material seen from New Guinea the parafrontals pale golden yellow and strikingly contrasting with whitish pollinose facial regions. Parafacials subequal in width to third antennal segment or slightly wider, sparsely haired only on about uppermost fifth or sixth or at most on upper quarter. Antennae long, third segment about 3·1 times as long as second segment and all blackish brown (trace of orange colour as usual at junction with second segment). Palpi pale brown to blackish brown, sometimes paler at tips. Pollinosity of mesonotum usually pale greyish or yellowish grey, brassy yellow in specimens seen from New Guinea. Tarsal claws long. Abdomen with mainly dark ground colour, sometimes rather reddish orange laterally on T3, pollinosity usually yellowish or greyish white, pattern on dorsum of intermediate tergites not very noticeably shifting, T3 blackish to naked eye on about hind two-fifths, T4 pollinose on anterior three-quarters or two-thirds and black usually on only about hindmost quarter; specimens seen from New Guinea with golden yellow pollinosity and wider dark hind border to T4. Dorsal hair of T4 in about eight to eleven series, discal setae of T5 short, strong and rather numerous posteriorly. Hair-patches of T4 venter large and dense, similar to those of *curvipalpis* (Text-fig. 28). Genitalia: aedeagus of non-bifurcate type (Text-fig. 34); paralobes without spinules, paralobes and mesolobes both unusually short and broad in lateral view (Text-fig. 49); mesolobes truncate apically in posterior view (Text-fig. 65). Length about 8–11 mm., usually about 9 mm.

♀. Vertex about 0·30 of head-width. Third antennal segment 2·6–2·8 times as long as second segment. Dorsal hair of T4 in about seven or eight series. [Note: bred material not available, correct association of wild caught specimens with ♂ assumed from identity of data.]

Material examined. Holotype of *immersa* ♂. CELEBES: Macassar (*A. R. Wallace*). Lectotype of *latiforceps* ♂. FORMOSA: Kankau, Koshun, 7.viii.1912 (*H. Sauter*).

Paralectotypes of *latiforceps*. FORMOSA: 1 ♂, Kankau, ix.1912 (*H. Sauter*) (B.M. Nat. Hist.); 2 ♂, Sokutsu, ix.1912 (*H. Sauter*) (D. Ent. Inst.); 4 ♂, Kankau Koshun, 7.viii.1912 (*H. Sauter*) (D. Ent. Inst.); 1 ♂, Kankau, Koshun, v.1912 (*H. Sauter*) (D. Ent. Inst.); 1 ♂, Kankau, Koshun, iv.1912 (*H. Sauter*) (D. Ent. Inst.).

Other material. NEW GUINEA: 1 ♂, 1 ♀, Papua, Kokoda, 1,200 ft., vii–x.1933 (*L. E. Cheesman*) (B.M. Nat. Hist.); 1 ♂, Morobe District, Wau, 3,500–4,000 ft., 18.v.1965 (*R. W. Crosskey*) (B. M. Nat. Hist.). FORMOSA: 1 ♀, Kankau, Koshun, 7.viii.1912 (*H. Sauter*) (D. Ent. Inst.: misidentified syntype of *inconspicuoides*).

In addition to the foregoing one female probably belonging to this species: NEW BRITAIN: Keravat, 1.vii.1965 (*R. W. Crosskey*) (B.M. Nat. Hist.).

Distribution. Known only from above-listed material from Formosa, Celebes and the Territory of Papua and New Guinea.

Hosts. Unknown.

This is a distinctive species, easily recognized in the male by the short and very broad paralobes and mesolobes (to which Baranov's name *latiforceps* refers), a character shared only with *P. summaria*—which may not be specifically distinct (see under discussion of that species). Austen (1907 : 340) synonymized *immersa* Walker with *ophirica* Walker, but examination of the type-material (including the male genitalia) for the present revision has shown that this synonymy was wrongly established.

Palexorista summaria (Townsend, 1927)

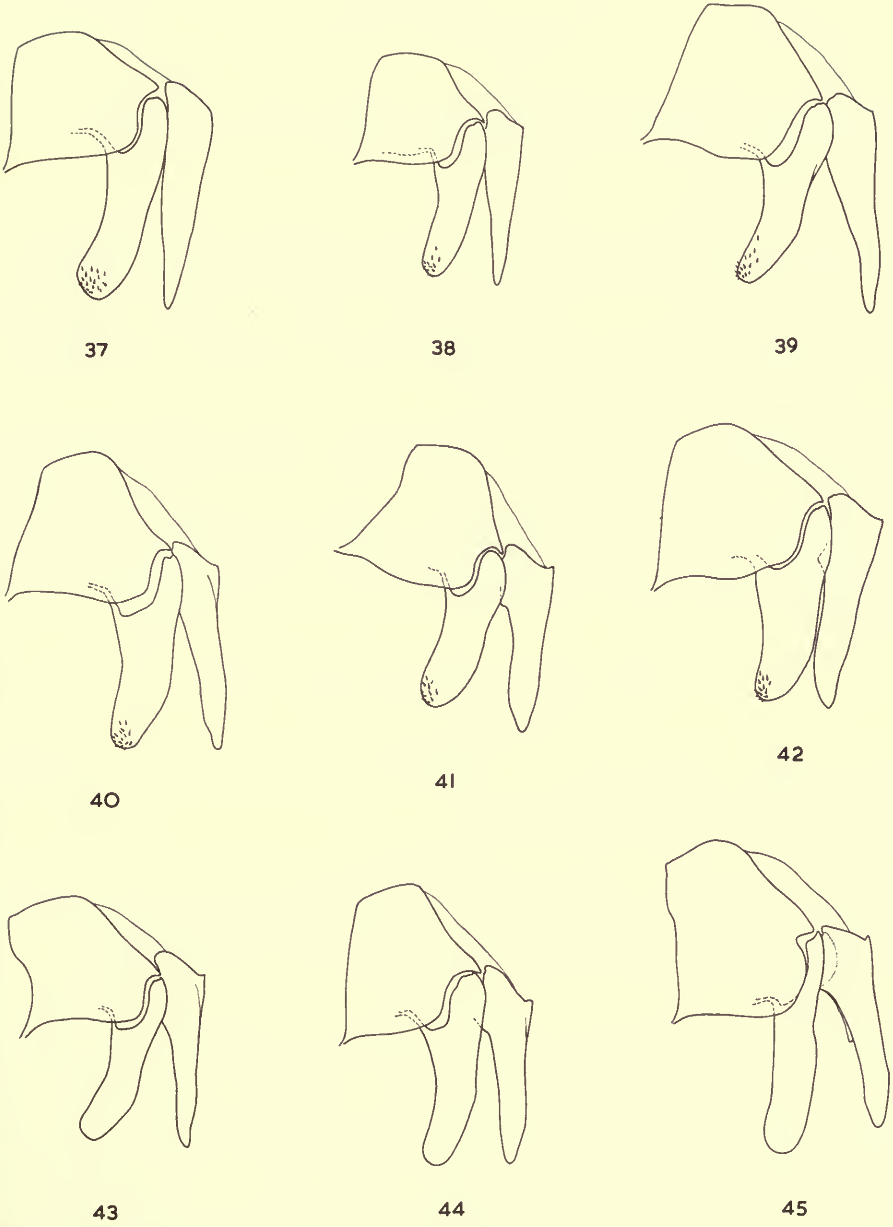
(Text-figs. 18, 26, 33, 50, 66)

Sumatrodoria summaria Townsend, 1927 : 64. Lectotype ♀ [see note below], SUMATRA. Possibly lost [male paralectotypes examined].

Palexorista summaria (Townsend) Crosskey, 1966 : 136.

Nomenclatural note: *Sumatrodoria summaria* was originally described from four male syntypes and one female syntype, all from Fort de Kock, Sumatra. In later treatment of the genus *Sumatrodoria* Townsend, of which *summaria* is type-species, Townsend (1941, *Man. Myiol.* **11** : 201) cited " Ht [=holotype] female, At male " and mentioned male paratypes in Washington and Leiden. As the type-series contained only a single female, Townsend (1941) provides a nomenclaturally valid restriction of the name to a single specimen and the female must be accepted as lectotype by restriction of Townsend. This is unfortunate, since the female lectotype cannot now be found in Amsterdam Museum and in any case the female sex carries no satisfactory specific characters. One of the male paralectotypes is in the Zoölogisch Museum, Amsterdam and one in the U.S. National Museum, Washington, and the following description is based on these specimens. I have been unable to trace the whereabouts of the female lectotype, which must be considered possibly lost.

♂. Head profile as in Text-fig. 18, frontal length about 1·25 times as great as facial length, antennal axis only very slightly above ocular axis. Vertex 0·31 of head-width, upper frons rather broad. Upper occiput with a sparse row of black setulae behind postocular row. Interfrontal area subequal in width to a parafrontal. Outer vertical setae undeveloped. Parafrontals greyish white pollinose and not contrasting in colour with white pollinose face and parafacials. Parafacial at mid height about as wide as third segment of antenna, with sparse long hair on about uppermost quarter. Antennae long, third segment about 3·3 times as long as second segment and entirely blackish brown. Palpi dark brown, tips slightly paler. Mesonotum with pale greyish pollinosity, trace of yellowish brown pollinosity near scutal vittae. Tarsal claws long, slightly longer than last tarsal segment. Abdomen with mainly dark ground colour, reddish brown laterally on T3, pollinosity whitish with slight shifting appearance, to naked eye T3 mainly dark with pollinosity confined narrowly to anterior border, T4 pollinose on about basal half with posterior half blackish. Dorsal hair of T4 in about nine or ten series; discal setae of T5 numerous, short and strong. Hair-patches of T4 venter unusually small (Text-fig. 26), less than half as wide as half-tergite venter and very compact. Genitalia: aedeagus of non-bifurcate type, as in Text-fig. 33; paralobes and mesolobes short and very broad in



FIGS. 37–45. Paralobes and mesolobes of male hypopygium in profile of: 37, *P. subanajama* lectotype; 38, *P. lucagus*; 39, *P. aequalis*; 40, *P. munda*; 41, *P. inconspicuoides*, paralectotype; 42, *P. laetifica*; 43, *P. solennis*, from lectotype of *discreta*; 44, *P. laxa*; 45, *P. reclinata*, paratype.

lateral view (Text-fig. 50), paralobes without spinules; mesolobes subtruncate in posterior view (Text-fig. 66). Length about 9 mm.

♀. Characters not known, probably not distinguishable from that of *immersa* [female lectotype not seen, whereabouts unknown, no other female material available and no characters of value mentioned in very brief original description of Townsend].

Material examined. Paralectotypes. 2 ♂, SUMATRA: Fort de Kock, 920 m., 1925 and 1926 (*E. Jacobson*) (U.S. Nat. Mus. & Zool. Mus. Amsterdam).

Distribution. Known only from the type-series from Sumatra.

Hosts. Unknown.

Palexorista summaria is very closely allied to *P. immersa* (Walker) and there is a strong similarity in the unusually short and broad paralobes and mesolobes: it is possible that *summaria* is not specifically distinct from *immersa*, but I maintain it as a separate species at present because of the slightly wider male frons, the conspicuously smaller and more compact abdominal hair-patches and minor differences in the shape of the mesolobes in posterior view.

Baranov (1934*a*) synonymized *summaria* with *Drino* (*Zygobothria*) *atropivora* (Robineau-Desvoidy, 1830) and the synonymy—following Baranov—was later recorded by Mesnil (1949 : 12, 1951 : 168). The type-material of *summaria* shows very small ocellar setae and hairing on the upper part of the parafacials (characters of *Palexorista*), and the synonymy of *summaria* with *atropivora* established by Baranov is incorrect (*atropivora* is a true *Zygobothria* in which the ocellar setae are strong and the parafacials wholly bare).

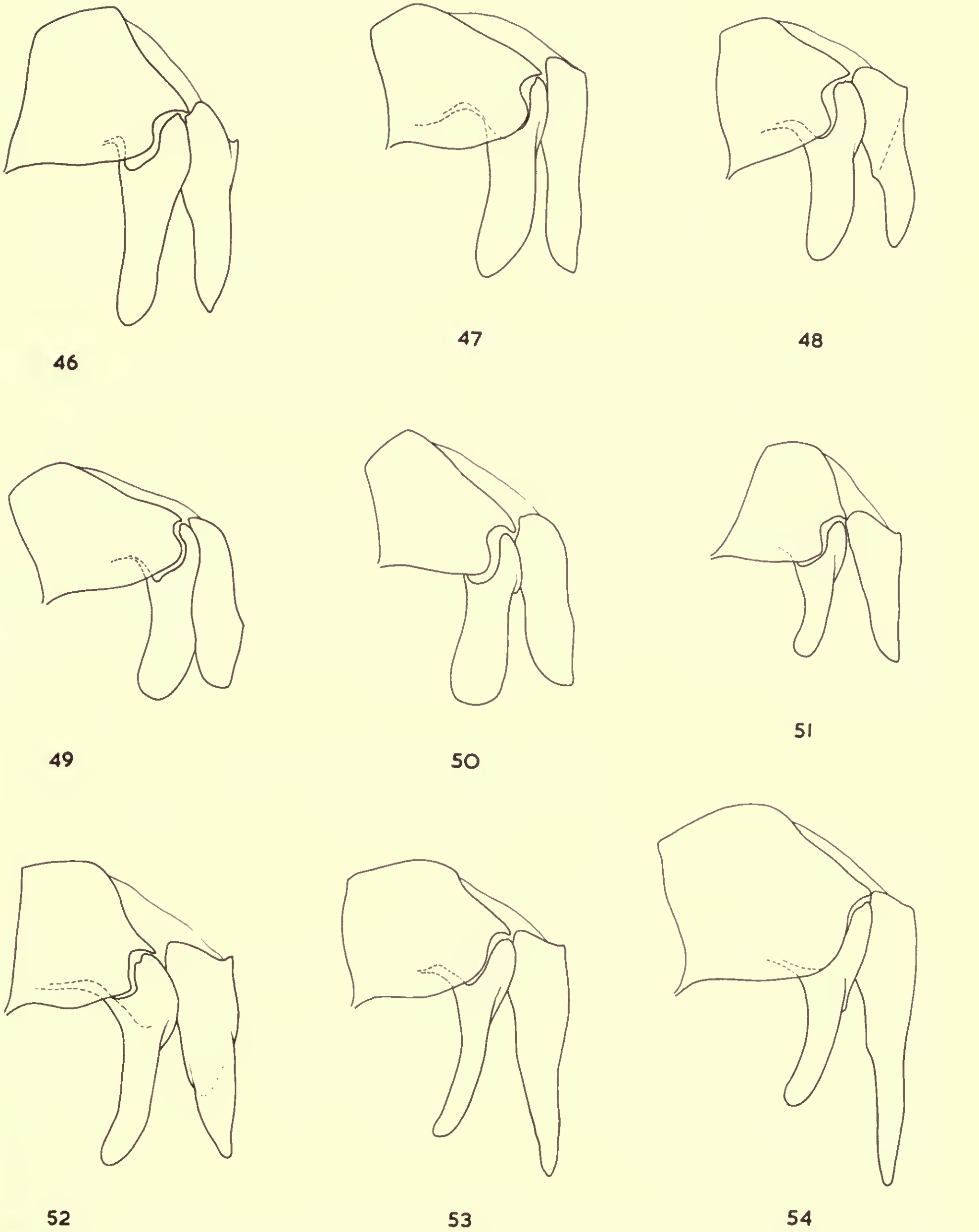
Palexorista deducens (Walker, 1860)

(Text-figs. 16, 35, 48, 71)

Eurygaster deducens Walker, 1860 : 127. Lectotype ♂, CELEBES. In British Museum (Natural History), London. [Examined]
Exorista deducens (Walker) Wulp, 1896 : 130.
Palexorista deducens (Walker) Crosskey, 1966 : 135.

Lectotype Designation: the type-material of *deducens* is male, not female as stated in error by Walker, and consists of two conspecific male syntypes from Macassar, one of which has been labelled and is here designated as LECTOTYPE.

♂. Head profile as in Text-fig. 16, frontal length about 1·23 times as great as facial length, antennal and ocular axes coincident. Vertex 0·23–0·25 of head-width, upper frons narrower than usual. Upper occiput with a row of black setulae behind postocular row, irregular and sometimes sparse. Interfrontal area slightly narrower than a parafrontal. Outer vertical setae undeveloped. Parafrontals yellow pollinose and slightly contrasting with yellowish white pollinose face and parafacials in type-material from Celebes, parafrontals pale greyish and not contrasting with whitish pollinose facial regions in specimens seen from Buru. Facial region rather flat and in facial view more widely diverging towards vibrissae than in most species. Parafacials slightly narrower than or subequal in width to third antennal segment, conspicuously haired on uppermost third or on upper half (as in lectotype). Antennae very short, third segment 2·1–2·2 times as long as second segment and entirely blackish brown. Palpi brown with yellowish apices. Mesonotum pale yellow grey or greyish pollinose in material seen from Buru, pale golden pollinose in type-material, scutum of lectotype with traces of golden brown pollinosity



FIGS. 46–54. Paralobes and mesolobes of male hypopygium in profile of: 46, *P. curvipalpis*, lectotype; 47, *P. ophirica*, paralectotype; 48, *P. deducens*, lectotype; 49, *P. immersa*, from paralectotype of *latiforceps*; 50, *P. summaria*, paralectotype; 51, *P. painei*; 52, *P. parachryscps*; 53, *P. sororcula*, holotype; 54, *P. bancrofti*, holotype.

around sublateral pair of scutal vittae. Tarsal claws long. Abdomen with dark ground colour, trace of reddish ground colour laterally on T3 in Buru specimens, pollinosity whitish in Buru specimens and pale yellow in type-material, only a weak shifting appearance, pollinosity of T4 on about basal half or three-fifths so that hind margin is broadly black. Dorsal hair of T4 in about seven or eight series, discal setae of T5 moderately strong. Hair-patches of T4 venter large, similar to those of *curvipalpis* (Text-fig. 28) or slightly smaller. Genitalia: aedeagus of non-bifurcate type (Text-fig. 35); paralobes without spinules, mesolobes short and with characteristic curvature in lateral view (Text-fig. 48); mesolobes in posterior view with bluntly and evenly rounded tips (Text-fig. 71). Length about 8 mm.

♀. Unknown.

Puparium: posterior spiracles on unusually large trifid bosses, spiracular slits long and very strongly serpentine, surface hairs of puparium short and dense and not at all spiniform.

Material examined. Lectotype ♂. CELEBES: nr Macassar, 1857–58 (*A. R. Wallace*).

Paralectotype ♂. Data as for lectotype (B.M. Nat. Hist.).

Other material. BURU: 2 ♂, Station 1, 1921 (*L. J. Toxopeus*) (B.M. Nat. Hist.).

Distribution. Known only from above-listed material from Celebes and Buru in eastern Indonesia.

Hosts. Unknown. The specimens from Buru have the associated puparia and are therefore reared material but there is no host information on the data labels.

Palexorista deducens is a distinctive species easily recognized by the form of the mesolobes of the male hypopygium and by the distinctive puparium in which the posterior spiracular slits are very stongly serpentine (this character may possibly be found to occur in other species for which the puparium is at present unknown, but *deducens* is the only species of *Palexorista* known to me at this time to possess this character).

Palexorista parachrysops (Bezzi, 1925)

(Text-figs. 20, 25, 52, 68)

Sturmia parachrysops Bezzi, 1925 : 114. Lectotype ♂, MALAYA. In British Museum (Natural History), London. [Examined]

Drino (*Prosturmia*) *parachrysops* (Bezzi) Mesnil, 1951 : 194.

Palexorista parachrysops (Bezzi) Crosskey, 1966 : 136.

Lectotype Designation: this species was described from four specimens, referred to by Bezzi as type ♀, type ♂, and as two additional specimens with sex not stated. The syntypes with stated sex are both in British Museum and the male has been labelled and is here designated as LECTOTYPE: the whereabouts of the other two syntypes is not known. It should be noted that the male lectotype and the female paralectotype are both labelled with the name and sex in Bezzi's writing and that the female lacks the abdomen.

♂. Head profile as in Text-fig. 20, frontal length about 1·22 times as great as facial length, antennal axis only slightly above ocular axis. Vertex 0·30–0·31 of head-width. Frons with fewer pairs of frontal setae than usual, only about five or six pairs (sometimes with tendency to be in doubled rows), uppermost pair of frontals sometimes directed slightly backwards. Upper occiput without black setulae behind postocular row. Interfrontal area usually more reddish or orange than in other species, exceptionally narrow and at narrowest but little or not more than half as wide as parafrontal at widest. Outer vertical setae undeveloped. Parafrontals pale yellow to golden orange pollinose near the interfrontal area, especially near ocelli, yellowish colour usually mainly along rows of frontal setae, the pollinosity more silvery or creamy white towards the eyes; face and parafacials white pollinose. Parafacials broad, conspicuously wider than third antennal segment; parafacial hair very sparse and inconspicuous, at most on uppermost quarter and sometimes only a single hair or perhaps two immediately below lowest frontal seta. Antennae of medium length, third segment 2·7–2·8 times as long as second segment, the latter rather reddish; third segment extensively yellowish orange basally and along inner edge, otherwise brown. Palpi entirely yellow. Mesonotum with pale greyish yellow pollinosity. Tarsal claws of intermediate length, subequal to last tarsal segment (distinctly longer than in *painei* or *sororcula* but shorter than in most species). Abdomen slightly elongate and tapering, ground colour extensively reddish yellow, blackish medially on T3 and on hind margins of intermediate tergites, pollinosity pale yellowish white and on T4 covering most of tergite (only extreme hind border of T4 narrowly dark brown or blackish). Dorsal abdominal hair rather long and strong but unusually sparse, hair of T4 in only three or four or at most five series; median marginal setae of T3 unusually long and strong, discal setae of T5 few and strong. Hair-patches of T4 venter very large and loose (Text-fig. 25), at least two-thirds as wide as half-tergite, apices of the hairs overlapping end of tergite. Genitalia: aedeagus of non-bifurcate type, very similar to that of *painei* (Text-fig. 36); paralobes without spinules, in lateral view slender and much narrower than the broad tapering mesolobes (Text-fig. 52); mesolobes in posterior view (Text-fig. 68) with bluntly rounded tips, slit between the free apices much shorter than fused basal part. Small species, length 5·5–7·0 mm., lectotype 6·3 mm.

♀. Vertex 0·31–0·33 of head-width. Third antennal segment 2·4–2·7 times as long as second segment. Head in facial view unusual, inner margins of eyes distinctly concave so that facial region between eyes bows outwards and is widest at about level of end of second antennal segment (Text-fig. 76), facial region thence narrowing slightly towards vibrissae. Interfrontal area very narrow, only half as wide as parafrontal or even less. Parafrontals mainly clear pale yellow to deep golden pollinose, only whitish pollinose at extreme lower ends (usually with whitish pollinosity extending slightly upwards along eye margin). Third antennal segment sometimes largely orange, only brownish apically and along fore border; second antennal segment usually reddish. Dorsal hair of T4 in only about four series. Pollinosity of mesonotum and abdomen sometimes golden-yellow in African specimens.

Puparium: each part of the trifid boss of posterior spiracles well separated, spiracular slits almost straight, surface hairs moderately long and not thorn-like.

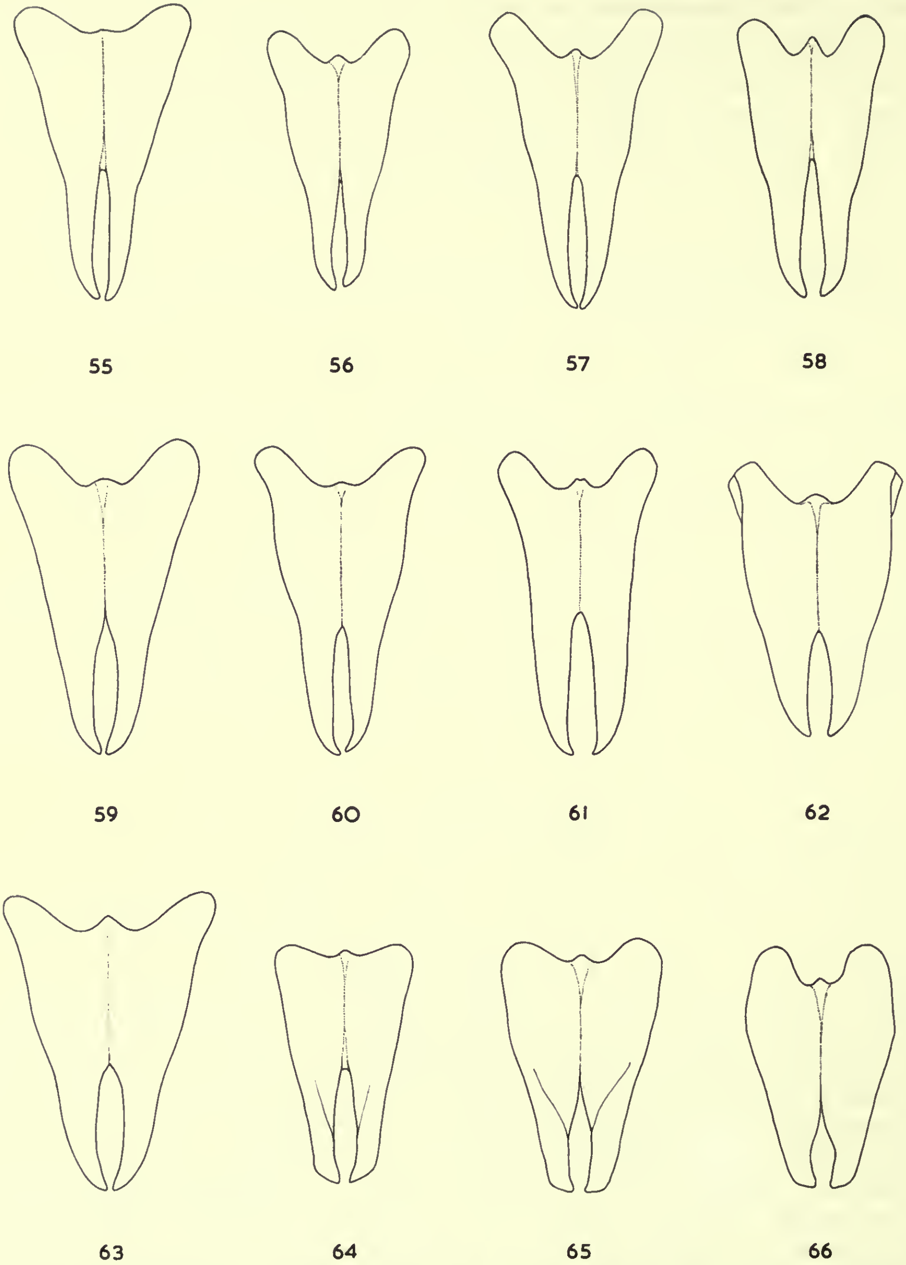
Material examined. Lectotype ♂. MALAYA: Kuala Lumpur, par. on *Psara bipunctalis*, 20.vi.1923 (*G. H. Corbett* & *B. A. R. Gater*).

Paralectotype ♀. Data as for lectotype (B.M. Nat. Hist.).

Other material. MALAYA: 1 ♀ with puparium, Kuala Lumpur, parasite of *Psara* sp. (*G. H. Corbett*). INDIA: 1 ♀, Central Provinces, Hoshangabad, Rahatgaon, par. on *Hapalia machaeralis* larva, 9.viii.1926 (*S. N. Chatterjee*); 2 ♂, South India, Samasetti, Palayam, par. on *Eublemma* sp., ii.1924 (*C. K. S.*). CEYLON: 2 ♂, 1 ♀, Trincomali, 5 & 20.vii.1890 (*Yerbury*); 1 ♀, Suduganga, 30.iii.1919 (*R. Senior White*). KENYA: 1 ♀, Naivasha, iv.1940 (*H. J. A. Turner*). GHANA: 1 ♂, 1 ♀, Kumasi, 27.x. and 24.xi.1946 (*J. Bowden*). MALI: 1 ♀, French Sudan, ex pupae of Lepidoptera (*R. Dugast*). SENEGAL : 1 ♂, Bambey, ex *Etiella zinckenella*, 22.xii.1942 (*J. Risbec*); 1 ♀, Bambey, ex Limacodid, 5.i.1943 (*J. Risbec*); 1 ♀, Bambey (*J. Risbec*).

All above-listed material in British Museum (Natural History).

Distribution. *Palexorista parachrysops* occurs from West Africa to Malaya, but records are few, and the species is not yet known from anywhere between Kenya



FIGS. 55–66. Mesolobes of male hypopygium in posterior view of: 55, *P. subanajama*, lectotype; 56, *P. lucagus*; 57, *P. munda*; 58, *P. inconspicuoides*, paralectotype; 59, *P. laetifica*; 60, *P. solennis*, from lectotype of *discreta*; 61, *P. laxa*; 62, *P. reclinata*, paratype; 63, *P. curvipalpis*, lectotype; 64, *P. ophirica*, paralectotype; 65, *P. immersa*, from paralectotype of *latiforceps;* 66, *P. summaria*, paralectotype.

and India. Despite the discontinuity, there is no doubt that African material is conspecific with the type-material from Malaya: the male genitalia of West African specimens agree completely with those of Oriental material, and all other distinctive characters agree also.

Hosts. The hosts of *P. parachrysops* so far known are all lepidopterous and include an unidentified Limacodid in Senegal, an unidentified species of *Eublemma* (Noctuidae) in southern India, and the following Pyralidae: *Psara bipunctalis* (Fabricius) and *Pyrausta machoeralis* (Walker) in the Pyraustinae from Malaya and India respectively, and *Etiella zinckenella* (Treitschke) in the Phycitinae in Senegal.

P. parachrysops has been correctly recorded in the literature as a parasite on *Psara bipunctalis* by Bezzi (1925) in the original description and later by Corbett & Miller (1928, 1933), the records being based on material from Malaya where *Psara bipunctalis* is a pest of egg-plant; Beeson & Chatterjee (1935, 1939) correctly record it as a parasite on the caterpillars of *Hapalia machaeralis* (=*Pyrausta machoeralis*), a defoliator of teak in India.

Thompson (1946 : 339) has recorded *parachrysops* as a parasite on *Leucinodes* sp. (Pyralidae), based on material in British Museum collection: it is not possible to confirm this record, as no material reared from *Leucinodes* can now be found in the B.M. collection.

This species is probably allied to *P. painei* (Baranov) but is easily distinguished from this and other species, apart from male genital characters, by the unusual facial appearance of the female, by the very large and rather shaggy hair-patches of the abdomen of the male (in which the ends of the hairs overlap the following segment, surpassing the end of T4), by the very sparse and strong abdominal hairing, and by the exceptionally narrow interfrontal area in both sexes. The completely yellow palpi are also characteristic.

Palexorista painei (Baranov, 1934)

(Text-figs. 19, 27, 36, 51, 69)

Sturmia painei Baranov, 1934*b* : 42. Lectotype ♂, JAVA. In British Museum (Natural History), London. [Examined]
Palexorista painei (Baranov) Crosskey, 1966 : 136.

Lectotype Designation: the type-material seen of *Sturmia painei* consists of two male and two female syntypes, with data as stated by Baranov and each labelled " Sturmia Painei n. sp. N. Baranoff " in Baranov's writing; all of these syntypes are in British Museum, and one male has been labelled and is here designated as LECTOTYPE. It should be noted that the original description is headed " ♂ ", but that Baranov describes characters of the " Weibchen " in the description, and it is therefore certain that *painei* was based on both male and female syntypes (Baranov does not state the number of specimens seen of either sex).

♂. Head profile as in Text-fig. 19, profrons hardly at all narrower than gena, frontal length about 1·19 times as great as facial length, antennal axis only slightly above ocular axis. Vertex 0·27–0·29 of head-width. Frons usually rather strongly convex. Upper occiput with a row of black setulae behind postocular row. Interfrontal area unusually narrow, parafrontals wider than normal and interfrontal area at mid point only about half or two-thirds as wide as parafrontal. Outer vertical setae undeveloped. Parafrontal colour unusual, pollinosity brassy yellow to deep golden on about upper third and rather abruptly contrasting with silvery white or creamy white pollinosity on about lower two-thirds; face and parafacials entirely creamy or silvery white pollinose, like the lower parafrontals; ground colour of facial regions reddish. Parafacials a little wider than third antennal segment, haired on uppermost quarter or third. Antennae of medium length, third segment 2·7–2·8 times as long as second segment; second segment more reddish brown than usual, third segment blackish brown or dark brown except for some orange basal suffusion which usually extends slightly along inner edge of segment. Palpi yellow, at most only brownish at extreme base. Mesonotal pollinosity golden yellow, with similar pollinosity on abdomen giving species a distinctly golden appearance. Tarsal claws very small, conspicuously shorter than last tarsal segment. Abdomen with blackish brown ground colour medio-dorsally and along hind margins of intermediate tergites, and with ground colour extensively reddish orange laterally and reddish brown on T5; abdominal pollinosity golden yellow with little or no shifting appearance, contrasting with blackish hind margins of intermediate tergites, dark hind margin of T4 occupying about one-third of tergite length. Median marginal setae of T3 small and inconspicuous; dorsal hair of T4 in about five to seven series; discal setae of T5 strong, rather long but not very numerous. Hair patches of T4 venter of medium size (Text-fig. 27), somewhat less than half width of the half-tergite. Genitalia: aedeagus of non-bifurcate type, as in Text-fig. 36; paralobes without spinules, paralobes and mesolobes short with the former slender and rather narrower than the broad mesolobes in profile (Text-fig. 51); mesolobes in posterior view with bluntly and evenly rounded apices (Text-fig. 69). Length usually about 7 mm., range 5·5–9·1 mm., lectotype 7·4 mm.

♀. Vertex 0·27–0·31 of head-width. Third antennal segment 2·7–3·0 times as long as second segment. Interfrontal area much narrower than parafrontal, at mid height usually about 0·6 of parafrontal width. Parafrontals more extensively yellow than in ♂, about upper half or two-thirds pale yellow pollinose and lower half or lowest third creamy whitish pollinose; face and parafacials less silvery white than in ♂, sometimes pollinosity faintly yellowish white. Dorsal hair of T4 in only about three or four, at most five, series.

Puparium: slits of posterior spiracles almost completely straight, surface hairing very minute, short and slightly thorn-like.

Material examined. Lectotype ♂. JAVA: no locality, 1929–30, ex *Tirathaba* sp. (*R. W. Paine*).

Paralectotypes. 1 ♂, 2 ♀, data as for lectotype (B.M. Nat. Hist.).

Other material. JAVA: 2 ♂, 5 ♀, Buitenzorg, ex *Tirathaba rufivena*, iii–iv.1933 (*R. W. Paine*); 1 ♂, Bantam Coast, ii.1933 (*R. W. Paine*); 1 ♂, 3 ♀, West Java, 1929–30 (*R. W. Paine*); 1 ♂, 1 ♀, W. Java, ex *Tirathaba*, 1929–30 (*R. W. Paine*); 9 ♂, West Coast, ex *Tirathaba*, ii.1933 (*R. W. Paine*); 1 ♂, Anjer, ex *Tirathaba* sp., v.1930 (*R. W. Paine*); 1 ♂ with puparium, West coast, ex *Tirathaba* sp., x.1930 (*R. W. Paine*); 5 ♂, 10 ♀, some with puparia, emerged en route to Fiji, ex *T. rufivena*, vi.1933 (*R. W. Paine*).

All the above-listed material in British Museum (Natural History).

Distribution. So far as known *Palexorista painei* occurs only in Java. A few specimens were released in Fiji in 1933 (Paine, 1935 : 16), but *painei* almost certainly never became established in Fiji.

Hosts. The only known host is the Coconut Spike Moth, *Tirathaba rufivena* Walker (Lepidoptera : Pyralidae), from which the type-specimens and all other known material were reared. *Palexorista painei* parasitizes the larval stage of *T. rufivena* in Java, and an unsuccessful attempt was made to introduce the species into Fiji in 1933 for the biological control of the Fijian species of Coconut Spike Moth, *Tirathaba trichogramma* Meyrick (synonym of *T. complexa* Butler) (see Paine, 1935). Paine (op. cit.) records a 1·6% parasitism rate by *painei* on a sample of 3,000 fifth instar larvae of *Tirathaba rufivena* collected in 1933 on the West Coast of Java.

Palexorista painei is one of the most distinctive Oriental species, characterized by the very small claws of the male, the golden pollinose thorax and abdomen, and by the unusual appearance of the parafrontals in which the upper parts are yellow and the lower parts silvery or whitish. The affinities are probably with *P. sororcula* (Mesnil) and possibly *P. parachrysops* (Bezzi). The head facies of *P. painei* shows a notable likeness to that of some Carceliini, particularly in the genus *Argyrophylax* Brauer and Bergenstamm, but the puparial characters confirm without doubt its correct assignment to *Palexorista*.

Palexorista sororcula (Mesnil, 1949)

(Text-figs. 21, 32, 67)

Drino (*Prosturmia*) *sororcula* Mesnil, 1949 : 30. Holotype ♂, AUSTRALIA. In Deutsches Entomologisches Institut. [Examined]

Palexorista sororcula (Mesnil) Crosskey, 1966 : 136.

♂ [holotype]. Head profile as in Text-fig. 21, frontal length about 1·29 times as great as facial length, antennal axis almost level with ocular axis. Vertex 0·32 of head-width. Upper occiput of holotype without black setulae on one side but with a few on other (species probably normally without). Interfrontal area at mid point slightly narrower than parafrontal. Parafrontals each with supernumerary row of small frontal setae outside the main row. Outer vertical setae undeveloped. Parafrontals uniformly pale silvery greyish pollinose and not contrasting with slightly more white pollinose face and parafacials. Parafacial subequal in width to third antennal segment, inconspicuously haired on about uppermost quarter. Antennae short, third segment about 2·5 times as long as second segment, second segment unusually reddish and third segment mostly reddish yellow (only brownish apically and along fore border). Palpi yellow. Mesonotum thinly greyish pollinose, not at all yellow. Tarsal claws very small, shorter than last tarsal segment. Abdomen with mainly darkish ground colour and very pale whitish grey pollinosity, T4 mainly pollinose and without shifting appearance, only apical quarter of T4 or less black-brown; T5 pale pollinose on basal three-fifths with pale median pollinose line extending to hind margin of tergite and more or less separating paired postero-lateral dark areas. Dorsal hair of T4 in about six series; T5 with very sparse long hair anteriorly merging to distinct discal setae posteriorly. Hair-patch of T4 venter large, much as in *curvipalpis* (Text-fig. 28). Genitalia: aedeagus (Text-fig. 32) of non-bifurcate type; paralobes and mesolobes as in fig. 53, paralobes slender and narrower than mesolobes, without apical spinules; mesolobes in posterior view very long and subparallel (Text-fig. 67), unfused tips much shorter than fused basal part. Length 6·8 mm.

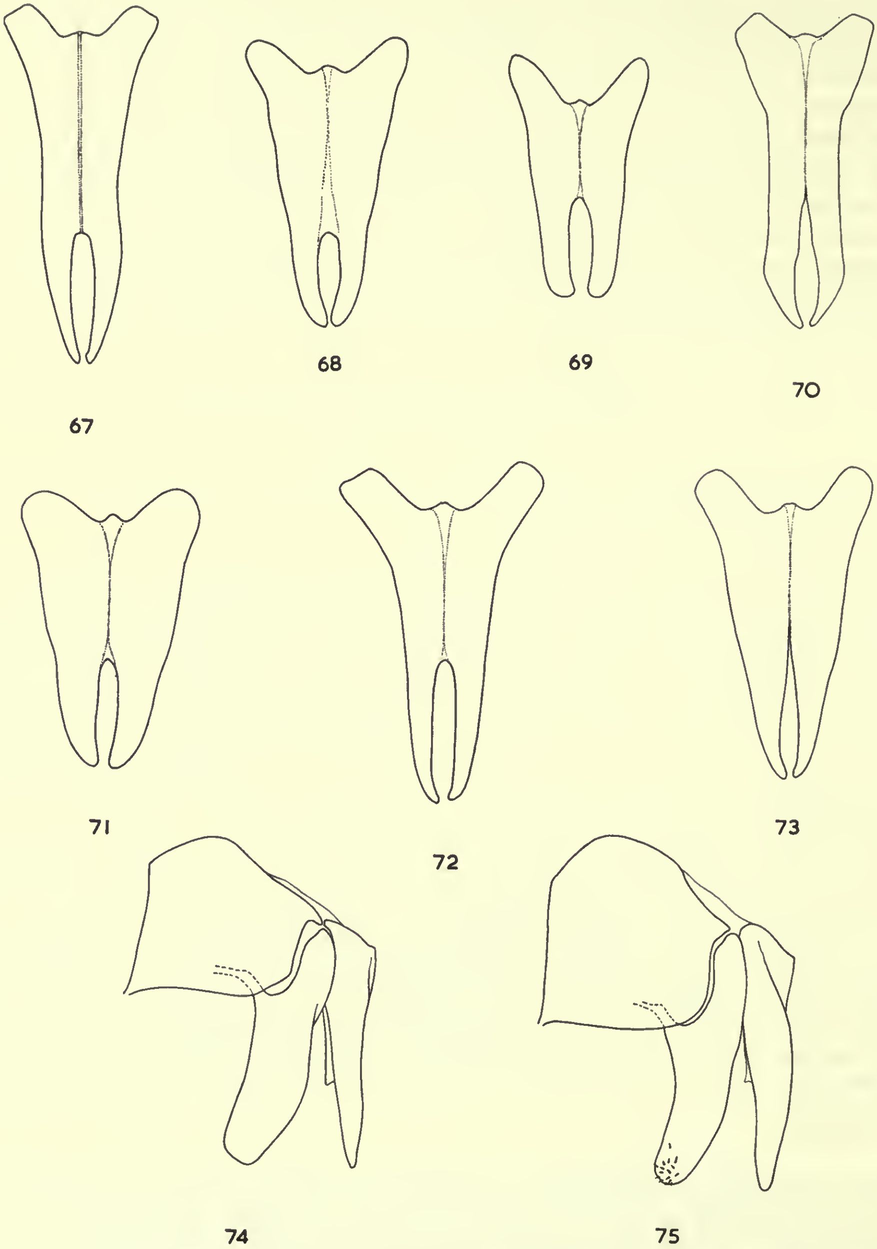
♀. Unknown.

Material examined. Holotype ♂. AUSTRALIA: Queensland, Herberton, 3,700 ft., i.1911 (*Dodd*) [labelled also " Phorcida sororcula Mesn. L. Mesnil det."].

Distribution. Known only from the holotype from Queensland.

Hosts. Unknown.

This species is probably most closely allied to *P. painei* (Baranov), having a similar head facies, short male claws and similar male hypopygium.

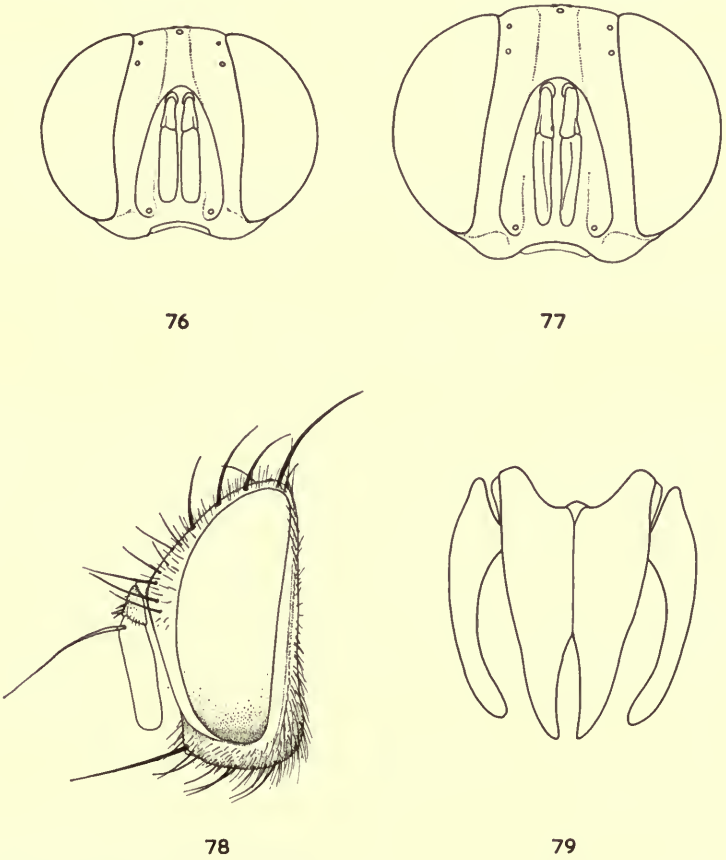


FIGS. 67–75. 67–73, Mesolobes of male hypopygium in posterior view of: 67, *P. sororcula*, holotype; 68, *P. parachrysops*; 69, *P. painei*; 70, *P. bancrofti*, holotype; 71, *P. deducens*, lectotype; 72, *P. imberbis* from Egypt; 73, *P. zonata* from Egypt. 74, 75, Paralobes and mesolobes of male hypopygium in profile of: 74, *P. imberbis* from Egypt; 75, *P. zonata* from Egypt.

***Palexorista bancrofti* sp. n.**

(Text-figs. 22, 54, 70)

♂. Head profile as in Text-fig. 22, frontal length about 1·20 times as great as facial length, antennal axis noticeably above ocular axis. Vertex 0·28–0·29 of head-width. Upper occiput with black setulae behind postocular row. Interfrontal area subequal in width to parafrontal. Outer vertical setae undeveloped. Parafrontals pale yellowish to golden pollinose; face and parafacials whitish pollinose and rather conspicuously contrasting with yellow parafrontals. Parafacials conspicuously wider than third antennal segment, haired on about uppermost third. Antennae long, third segment about 3·1 times as long as second segment and extensively reddish orange basally and posteriorly. Palpi mainly yellow or pale brownish on basal half. Pollinosity of mesonotum pale yellowish to golden, therefore distinctly yellowish species to naked eye. Tarsal claws long, length exceeding that of fifth tarsal segment. Abdomen with rather reddish



FIGS. 76–79. 76, 77, Outline of facial view of head of female of: 76, *P. parachrysops* showing strongly bowed inner eye margins; 77, other species of *Palexorista*, drawn from *P. lucagus*, in which facial region between eyes widest near vibrissae and inner eye margins not strongly convex. 78, Profile view of head of male of *P. reclinata* showing three pairs of reclinate setae on frons and vibrissae near level of mouth-margin. 79, Posterior view of mesolobes and paralobes of male hypopygium of *P. reclinata* showing unusually convex outer sides of paralobes.

ground colour, especially antero-laterally, and bronze-brown pollinosity over dark areas, T4 dark on posterior two-fifths; abdominal hair rather long and fine, T5 without truly developed discal setae but with long strong hair. Dorsum of T4 with about eight to ten hair series. Hair-patches of T4 venter large, similar to or a little larger than those of *curvipalpis* (Text-fig. 28). Genitalia: aedeagus of non-bifurcate type, very similar to that of *sororcula* (Text-fig. 32); paralobes unusually short in relation to long mesolobes (Text-fig. 54), without apical spinules, slender in profile; mesolobes in posterior view as in Text-fig. 70. Length about 8–9 mm.

♀. Vertex 0·31 of head-width. Third antennal segment 3·3 times as long as second segment, extensively reddish orange as in ♂. T5 with unusually weak fine hairing, no short strong discal setae. T4 dorsally with about eight or nine hair series. Interfrontal area slightly narrower than a parafrontal, more noticeably so than in ♂.

Holotype ♂. QUEENSLAND: Burpengarry (*T. L. Bancroft*). In Australian National Insect Collection, Canberra.

Paratypes. 2 ♂, 1 ♀, data as for holotype (B.M. Nat. Hist.).

Hosts. Lepidoptera : Pyralidae. Holotype and one paratype are labelled " Vict. [=victimising] Cryptocarya pyrale " and other two paratypes are labelled " Vict. Blue gum pyrale ", but there is no information on the pyralid host species.

The affinities of this species are probably most closely with *P. sororcula* (Mesnil), as shown by the close resemblance in the two species of the aedeagus and hypopygial lobes: *P. bancrofti* is easily distinguishable from *sororcula* by the long tarsal claws of the male and the unusually short paralobes compared to the length of the mesolobes (in other species of *Palexorista* for which the male genitalia are known the paralobes and mesolobes are of much the same length in lateral view).

Palexorista reclinata **sp. n.**

(Text-figs. 12, 45, 62, 78, 79)

♂. Head profile as in Text-fig. 12, frontal length about 1·12 times as great as facial length, antennal axis distinctly above ocular axis. Frons with a pair of strong reclinate setae immediately below the normal two pairs of reclinate orbital setae, sometimes with yet another pair of smaller reclinate setae below these, frons thus showing in all three pairs of strong subequal reclinate setae (Text-fig. 78) and sometimes a smaller supernumerary fourth pair. Vertex 0·28–0·30 of head-width. Upper occiput without black setulae behind postocular row. Interfrontal area subequal in width to a parafrontal. Outer vertical setae undeveloped. Parafrontals pale yellowish grey or very pale yellowish pollinose, not noticeably contrasting in colour with whitish or yellowish white pollinose face and parafacials. Parafacials conspicuously narrower than third antennal segment, with only a very few small hairs immediately below lowest frontal setae. Vibrissae only very slightly above level of mouth-margin. Gena slightly narrower than profrons. Antennae long, third segment 4·0–4·4 times as long as second segment and almost entirely blackish brown (trace of orange colour at joint with second segment). Palpi brownish on basal half shading to tawny yellowish on apical half. Pollinosity of mesonotum pale greyish yellow, naked eye appearance more greyish than yellowish species. Tarsal claws and pulvilli very long. Abdomen with mainly dark ground colour largely covered by pale greyish yellow pollinosity, appearance rather greyish to naked eye and trace of fine median blackish line distinct: T3 and T4 only very narrowly blackish brown posteriorly, posterior dark marginal band on T4 not extending forwards much beyond basal of marginal setae. Dorsal hair of T4 in about six or seven hair series; discal setae of T5 very strong. Hair-patches of T4 venter large, similar to those of *curvipalpis* (Text-fig. 28). Genitalia: aedeagus of bifurcate type; paralobes and mesolobes as in Text-figs. 45 and 62, paralobes without apical spinules and in posterior view of hypopygium unusually strongly convex (Text-fig. 79). Length about 7·5–9 mm.

♀. Unknown.

Holotype ♂. S. INDIA: Madura District, Alagar Kovil, 20.iii.1936 (*B.M.–C.M. Expedn. S. India*). In British Museum (Natural History), London.

Paratypes. 4 ♂, data as for holotype (B.M. Nat. Hist.).

Hosts. Unknown.

Palexorista reclinata sp. n. stands rather apart from other species of *Palexorista* because of the additional reclinate setae on the frons, the unusually narrow gena, the vibrissae almost level with the mouth-margin, and the abdominal pollinosity and pattern; in addition, the fourth antennal segment in relation to the second is longer than in other species, and the paralobes of the male hypopygium are more strongly bowed than usual. I am not at all certain that the species should be assigned to *Palexorista,* but this appears to be the best provisional generic placing—at least until the affinities of *reclinata* can be better assessed from knowledge of the female and the hosts, at present unknown. The body facies, particularly the head and antennal proportions, the chaetotaxy of the frons and the appearance of the abdomen suggest that *P. reclinata* may be more closely related to the Carceliini than the Sturmiini, and there is some resemblance to the genus *Argyrophylax* Brauer & Bergenstamm. It may be noted that in all the type-material there is only a single strong postvertical setula on either side of the cerebrale, whereas two or three are usually (though only one occurs exceptionally) present in males of *Palexorista.*

SYNOPSIS OF THE ORIENTAL SPECIES OF *PALEXORISTA* AND THEIR KNOWN HOSTS

The following host list is based only upon reared parasite material examined and identified during the present revision. It is impossible to be certain that the host data accompanying the tachinid material is based always on correct identification of the host, but many of the hosts are well-known and widespread lepidopterous pests and the correctness of the host identifications is here assumed (in the absence of any way of checking them). All Oriental species of *Palexorista* are listed (together with synonyms so as to provide a check-list of names), but no hosts are yet known for some species. The known hosts are all in the Lepidoptera, and the host nomenclature is that currently valid; the localities of origin of reared specimens are shown for extra-limital material as well as that from the Oriental Region proper.

Palexorista bancrofti sp. n.
        unidentified Pyralid. QUEENSLAND

Palexorista bisetosa (Baranov, 1932)
        [Unknown]

Palexorista curvipalpis (Wulp, 1893)
    unisetosa (Baranov, 1932) syn. n.
        Suana concolor (Walker) (Lasiocampidae). CEYLON
        Hippotion celerio (L.) (Sphingidae). NEW BRITAIN
        unidentified Sphingids. CEYLON, QUEENSLAND

Palexorista deducens (Walker, 1860)
        [Unknown]

Palexorista dilaticornis (Mesnil, 1951)
unidentified Geometrid. INDIA

Palexorista immersa (Walker, 1860)
latiforceps (Baranov, 1932) syn. n.
[Unknown]

Palexorista inconspicuoides (Baranov, 1932)
[Unknown]

Palexorista laetifica (Mesnil, 1951)
Eterusia cingala Moore (Zygaenidae). CEYLON

Palexorista laxa (Curran, 1927)
Heliothis armigera (Hübner) (Noctuidae). TANZANIA, RHODESIA, SOUTH AFRICA, INDIA

Palexorista lucagus (Walker, 1849)
Spodoptera mauritia (Boisduval) (Noctuidae). INDIA
Spodoptera sp. (Noctuidae). THAILAND, MALAYA
Creatonotos gangis (L.) (Arctiidae). WEST PAKISTAN
Lymantria sp. (Lymantriidae). INDIA

Palexorista munda (Wiedemann, 1830)
Hippotion sp. (Sphingidae). INDIA

Palexorista ophirica (Walker, 1857)
Hulodes caranea (Cramer) (Noctuidae). MALAYA

Palexorista painei (Baranov, 1934)
Tirathaba rufivena Walker (Pyralidae : Pyraustinae). JAVA

Palexorista parachrysops (Bezzi, 1925)
Etiella zinckenella (Treitschke) (Pyralidae : Phycitinae). SENEGAL
Psara bipunctalis (Fabricius) (Pyralidae : Pyraustinae). MALAYA
Pyrausta machoeralis (Walker) (Pyralidae : Pyraustinae). INDIA
Eublemma sp. (Noctuidae). INDIA

Palexorista reclinata sp. n.
[Unknown]

Palexorista solennis (Walker, 1859)
succini (Giebel, 1862)
latestriata (Wulp, 1881) syn. n.
discreta (Wulp, 1893) syn. n.
profana (Townsend, 1927)
inconspicuella (Baranov, 1932) syn. n.
imperfecta (Malloch, 1935) syn. n.
Crocidolomia binotalis Zeller (Pyralidae : Pyraustinae). CEYLON, JAVA
Enchocnemidia vertumnalis (Guenée) (Pyralidae : Pyraustinae). GUAM
Ostrinia nubilalis (Hübner) (Pyralidae : Pyraustinae). WEST IRIAN (INDONESIAN NEW GUINEA)
Homona sp. (Tortricidae). WEST IRIAN (INDONESIAN NEW GUINEA)
Cosmophila sp. (Noctuidae). INDIA

Hyblaea puera (Cramer) (Noctuidae). INDIA, BURMA
Amathusia phidippus (L.) (Amathusiidae). MALAYA

Palexorista sororcula (Mesnil, 1949)
[Unknown]

Palexorista subanajama (Townsend, 1927)
Acantholeucania loreyi (Duponchel) (Noctuidae). QUEENSLAND
Polydesma umbricola Boisduval (Noctuidae). NEW BRITAIN
Tiracola plagiata (Walker) (Noctuidae). MALAYA, NEW GUINEA

Palexorista summaria (Townsend, 1927)
[Unknown]

Palexorista sp. (?*P. ophirica* (Walker)) (2 ♀)
Setora nitens Walker (Limacodidae). MALAYA

Palexorista sp. (nr. *aequalis* (Malloch))
Acantholeucania loreyi (Duponchel) (Noctuidae). FIJI
Pseudaletia separata (Walker) (Noctuidae). FIJI

Palexorista sp.
Doratifera casta Scott (Limacodidae). NEW SOUTH WALES

Palexorista sp.
Persectania ewingii (Westwood) (Noctuidae). SOUTH AUSTRALIA

Palexorista sp.
unidentified Saturniid. NEW GUINEA

REVIEW OF LITERATURE HOST RECORDS OF ORIENTAL SPECIES OF *PALEXORISTA*

The literature of agricultural and forest entomology in the Oriental and Australasian Regions contains many records of the hosts of the species of *Palexorista* occurring in the Oriental Region. The present revisionary work has shown that the records were often based on identifications of the Tachinid parasites now known to be faulty, and the object of the present review is to bring together all the host records in the literature with an indication of their validity. That the hosts themselves were correctly identified is assumed in the absence of material associated with the parasites, and, with this proviso, the validity of the records is classified as follows:

(a) Correct: parasite material seen on which the record based and found to be correctly identified.
(b) Probably valid: no parasite material seen on which the record is based but the parasite identification almost certainly correct.
(c) Very suspect: no parasite material seen on which the record is based but the parasite almost certainly misidentified (judging mainly from present knowledge of geographical distribution of the parasite).
(d) Erroneous: parasite material seen on which the record is based and found to be misidentified (in these cases the correct identification is shown where possible in the review table below).

In the tabulation of the host records that follows, the names of the Tachinid parasites are given alphabetically according to the binomen used in the reference cited: most species were cited in combination with *Sturmia* Robineau-Desvoidy. Authors' names for both parasite and host are omitted for simplicity, but currently valid names of the Lepidoptera cited are shown in square brackets to relate the host names to contemporary literature (the record of *Hypaetra remosa* Hbn. as host of *Crossocosmia curvipalpis* Wulp by Wulp (1893) is omitted as Lepidoptera specialists have been unable to trace a *remosa* of Hübner under this or any similar spelling).

The host-parasite catalogue of Thompson (1944–47, 1951) is a compilation from the literature and is not cited in the table except in cases where it provides the first published records of parasite-host associations. Also omitted, since they are taken from Thompson's catalogue, are the records of host names given by Mesnil (1951 : 181–196) except for those relating to new Oriental species of *Palexorista* there described.

Parasite name	Host name	Reference	Locality	Validity
Blepharipoda lucagus	*Creatonotus gangis*	Husain & Mathur (1924)	Punjab	Correct
Blepharipoda ophirica	*Tiracola plagiata*	Corbett & Miller (1928), Corbett & Miller (1933), Greenstreet & Lambourne (1933)	Malaya	Erroneous (relates to *subanajama*)
Crossocosmia discreta	*Godara comalis* [*Crocidolomia binotalis*]	Wulp (1893)	Java	Correct
Drino dilaticornis	Geometrid. (unident.)	Mesnil (1951)	India	Correct
Drino laetifica	*Heterusia cingala* [*Eterusia cingala*]	Mesnil (1951)	Ceylon	Correct
Sturmia aequalis	*Prodenia litura* [*Spodoptera litura*]	Hoyt (1955)	Samoa	Probably valid
Sturmia bimaculata	*Cirphis loreyi* [*Acantholeucania loreyi*]	Veitch (1919)	Fiji	Erroneous
	Cirphis unipuncta [*Pseudaletia unipuncta*]	Veitch (1919)	Fiji	Erroneous
	Cirphis sp.	Lever (1941)	Fiji	Erroneous
Sturmia inconspicua	*Amathusia phidippus*	Corbett & Miller (1928, 1933)	Malaya	Erroneous (relates to *solennis*)
	Tiracola plagiata	Corbett & Miller (1928, 1933), Greenstreet & Lambourne (1933)	Malaya	Erroneous (relates to *subanajama*)
Sturmia inconspicuella	*Cirphis loreyi* [*Acantholeucania loreyi*]	Bell (1939)	Queensland	Probably valid
	Diacrisia obliqua	Thompson (1945, 1951)	India	Very suspect

Parasite name	Host name	Reference	Locality	Validity
	Hapalia machaeralis [*Pyrausta machoeralis*]	Beeson & Chatterjee (1935), Beeson & Chatterjee (1939), Beeson (1938)	India	Probably valid
		Garthwaite & Desai (1939), Braithwaite (1941)	Burma	Probably valid
	Hyblaea puera	Beeson & Chatterjee (1935), Beeson (1938), Beeson & Chatterjee (1939)	India	Correct
		Garthwaite & Desai (1939), Braithwaite (1941)	Burma	Correct
	Margaronia laticostalis [*Palpita laticostalis*]	Beeson & Chatterjee (1935), Beeson (1938), Beeson & Chatterjee (1939), Garthwaite & Desai (1939)	India	Probably valid
	Prodenia litura [*Spodoptera litura*]	Lever (1943)	Fiji	Very suspect
	Rhyacia ipsilon [*Agrotis ipsilon*]	Franssen (1935)	Celebes	Probably valid
	Spodoptera mauritia	Beeson & Chatterjee (1935), Garthwaite & Desai (1939)	India	Probably valid
	Telicota palmarum [*Cephrenes augiades*]	Corbett & Miller (1933)	Malaya	Very suspect
Sturmia inconspicuoides	*Acherontia styx*	Thompson, (1944, 1951)	India	Very suspect
	Amsacta sp.	Thompson (1944, 1951)	India	Very suspect
	Cirphis albistigma [*Leucania albistigma*]	Cherian & Anantanarayanan (1941)	India	Very suspect
	Cirphis loreyi [*Acantholeucania loreyi*]	Bell (1938)	Queensland	Very suspect (almost certainly *subanajama*)
	Cirphis spp.	Bell (1936)	Queensland	Very suspect (almost certainly *subanajama*)

	Crocidolomia binotalis	Baranov (1936)	New Britain	Very suspect
	Dasychira grossa	Corbett & Miller (1933)	Malaya	Very suspect
	Geometrid. (unident.)	Beeson & Chatterjee (1935)	India	Very suspect
	Hidari irava	Tjien Mo (1939)	Java	Very suspect
	Hulodes caranea	Corbett & Miller (1933)	Malaya	Erroneous (relates to *ophirica*)
	Hyblaea puera	Garthwaite & Desai (1939)	Burma	Very suspect
	Laphygma exigua [*Spodoptera exigua*]	Cherian (1937), Cherian & Kylasam (1939)	India	Very suspect
	Mahasena corbetti	Corbett (1937)	Malaya	Very suspect
	Prodenia litura [*Spodoptera litura*]	Corbett & Miller (1933)	Malaya	Very suspect
		Lever (1935)	Solomon Islands	Very suspect
	Spodoptera exempta	Bell (1937)	Queensland	Very suspect
	Spodoptera mauritia	Corbett & Miller (1933), Corbett (1937)	Malaya	Very suspect (almost certainly *lucagus*)
	Tiracola plagiata	Corbett & Miller (1933)	Malaya	Erroneous (relates to *subanajama*)
Sturmia painei	*Tirathaba* sp.	Baranov (1934*b*)	Java	Correct
	Tirathaba rufivena	Paine (1935)	Java	Correct
Sturmia parachrysops	*Acharana mutualis* [*Psara bipunctalis*]	Beeson (1938)	India	Correct
	Eublemma sp.	Thompson (1945, 1951)	India	Correct
	Hapalia machaeralis [*Pyrausta machoeralis*]	Beeson & Chatterjee (1935), Beeson (1938), Beeson & Chatterjee (1939)	India	Correct
	Psara bipunctalis	Bezzi (1925), Corbett & Miller (1928, 1933)	Malaya	Correct
	Leucinodes sp.	Thompson (1946, 1951)	India	Very suspect

NOTES ON MIDDLE EASTERN SPECIES OF *PALEXORISTA*

Two species of *Palexorista* that occur in the Middle East, *P. imberbis* (Wiedemann) and *P. zonata* (Curran), are very closely allied to some species—particularly *P. laxa* (Curran) and *P. munda* (Wiedemann)—that occur in the Oriental Region, and it has been necessary to study these forms from the Middle East in the course of the present revision in order to determine their identity; this was especially necessary in the case of *P. imberbis* (Wiedemann), since Mesnil (1949, 1951) has cited this name as a senior synonym of *laxa*. The conclusions from the present study, based on male genitalia as well as other characters, are that *P. imberbis* (Wiedemann), *P. laxa* (Curran), *P. zonata* (Curran) and *P. munda* (Wiedemann) are distinct, although very closely allied, species and that *laxa* is certainly not synonymous with *imberbis* as the latter is currently understood. The following notes on *P. imberbis* and *P. zonata*, and the accompanying figures of the male genitalia of these species, are here given so as to assist in the recognition of these species and to distinguish them from related species in Africa and the Oriental Region.

Palexorista imberbis (Wiedemann, 1830)

Tachina imberbis Wiedemann, 1830 : 317. Syntypes ♂, EGYPT. (Whereabouts not confirmed: see below).
Palexorista imberbis (Wiedemann) Crosskey, 1966 : 136.

The original type-material of *imberbis* evidently consisted of at least two male syntypes, since at the end of the original description Wiedemann cited the depositories as " Im Berliner Museum und in Professor Lehmann's Sammlung in Hamburg ". I have been unable to ascertain whether any syntype now exists: it is presumed that the one formerly in Hamburg is destroyed, and Dr. Schumann informs me that the Tachinid collection in Berlin Museum is in such need of curation that it is impossible to trace a possible type existing in it at the present time. Two species of *Palexorista*, so far as is known at present, occur in Egypt, the type-locality of *imberbis*; one species has the frons relatively narrow, has narrow parafacials, and has the head pollinosity slightly yellowish, and the other has an unusually broad frons, very wide parafacials and the head pollinosity entirely greyish white. The name *zonata* undoubtedly applies to the former species with narrow frons, and the name *imberbis* is accepted as applying to the latter species with broad frons (in accordance with the usage of Mesnil, 1949, 1951). The character of the wide frons and vertex in *imberbis* led Mesnil (1949) to place the name *laxa* in synonymy with *imberbis*, since *laxa* also shows an unusually wide frons and many other characters almost identical with those of *imberbis*: however the male genitalia are different in the two forms (although both lack stubby spinules on the paralobes), since the mesolobes in *imberbis* from Egypt are much more slender and tapering in profile than those of *laxa* (*cf.* Text-figs. 74 and 44), and the paralobes in *imberbis* are conspicuously wider than those in *laxa*. The antennae of *imberbis* from Egypt are shorter than those of *laxa*, the third antennal segment of the male in the former species measuring 2·0–2·2 times as great as the second segment, and the third segment in the male of *laxa* measuring 2·6–3·0 times the length of the second segment.

P. imberbis is easily distinguished from *P. zonata* by the absence of stubby spinules on the male paralobes (*cf.* Text-figs. 74 and 75) and by the broad frons.

♂♀. Antennal axis well above ocular axis, frontal length in ♂ about 1·13 times as great as facial length. Occiput without black occipital setulae behind postocular row. Vertex 0·31–0·33 of head-width in ♂, about 0·33 of head-width in ♀. Head pollinosity entirely white or greyish white. Third antennal segment in ♂ about 2·0–2·2 times as long as second segment. Parafacial exceptionally wide, in ♂ almost twice as wide as third antennal segment. Parafacials haired on about upper half in ♂ and upper two-fifths in ♀. Abdomen slightly reddish basally, dorsal hair of T4 in about six or seven series, ♂ hair-patches large. ♂ genitalia with bifurcate aedeagus very similar to that of *laxa* (Text-fig. 29), paralobes rather broad and without stubby black spinules (apical parts of paralobes with long hairs), mesolobes much narrower than paralobes and in profile rather straight and evenly tapering (Text-fig. 74), mesolobes in posterior view long and very slender (Text-fig. 72).

Material examined. No type-material seen.

Other material. EGYPT: 2 ♂, 1 ♀, Meadi, on large sunt moth, 20.vii.1912 (*F. H. G.*) (B.M. Nat. Hist.); 1 ♂, bred from large sunt moth larva, *Taragama acaciae*, 27.vi.1910 (*P. Willcocks*) (B.M. Nat. Hist.).

Palexorista zonata (Curran, 1927)

Sturmia zonata Curran, 1927 : 336. Holotype ♂, UGANDA. In British Museum (Natural History), London. [Examined]

Palexorista zonata (Curran) Crosskey, 1966 : 136.

This species occurs widely in East Africa, whence its range extends northwards and north-eastwards to the Sudan, Egypt and Arabia. It differs from both *P. imberbis* and *P. laxa* in having a much narrower frons and vertex, and in notable differences in the male genitalia, particularly in the presence of stubby black spinules on the apical parts of the paralobes (Text-fig. 75). A characteristic feature of the male genitalia of *P. zonata* is the curvature of the mesolobes: seen in profile these are distinctly convex on the posterior edge (Text-fig. 75). The curved shape of the mesolobes in lateral view assists in distinguishing *P. zonata* from *P. munda* (Wiedemann), an Oriental species very closely related to *zonata* and showing a generally very similar male hypopygium (*cf.* Text-figs. 40 and 75): the paralobes of the male genitalia of both *zonata* and *munda* have similar black spinules and are in shape much alike, and the mesolobes seen in posterior view are almost indistinguishable (*cf.* Text-figs. 57 and 73). The longer antennae of *zonata* (third segment in ♂ 2·8–3·3 times as long as second segment) provide a character separating this species from *munda* (third segment in ♂ 2·4–2·6 times as long as second segment), and this character taken together with the differently shaped mesolobes suggest that *munda* and *zonata* are best treated as distinct species: later work, when material is available from intermediate geographical areas, may indicate that only a single variable species is involved.

♂♀. Antennal axis well above ocular axis, frontal length in ♂ about 1·10 times as great as facial length. Occiput without black setulae behind postocular row. Vertex 0·27–0·29 of head-width in ♂, 0·31–0·34 of head width in ♀. Head pollinosity usually yellowish white on facial regions, usually pale yellowish grey to brassy yellowish on parafrontals; parafrontals sometimes entirely greyish and face whitish. Third antennal segment in ♂ 2·8–3·3 times as long as second segment, in ♀ 2·5–2·6 times as long as second segment. Parafacials narrow, only slightly wider than or subequal in width to third antennal segment, haired on uppermost third or two-fifths. Abdomen hardly at all reddish anterolaterally, dorsal hair of T4 in about seven or eight series, ♂ hair-patches large. ♂ genitalia with bifurcate aedeagus, paralobes apically with stubby black spinules and slightly angulate in lateral view (Text-fig. 75), mesolobes in profile with distinctive slightly convex posterior margin (Text-fig. 75) and in posterior view with acuminate apices (Text-fig. 73).

Material examined. Holotype ♂. UGANDA: Entebbe, 4.vi.1914 (*C. C. Gowdey*).

Paratypes. UGANDA: 1 ♀, data as for holotype (B.M. Nat. Hist.); 1 ♂, Entebbe, 8.vii.1914 (*C. C. Gowdey*) (B.M. Nat. Hist.); 1 ♀, Kampala, 8.viii.1914 (*C. C. Gowdey*) (B.M. Nat. Hist.).

Other material. EGYPT: 6 ♂, 9 ♀, Esbet el Nakhl, bred ex pupae of small sunt moth *Nadiasa obsoleta* Klug, xi.1909 (*F. C. Willcocks*). SUDAN: 1 ♂, Kodroko, 10.iv.1913 (*H. H. King*); 1 ♂, 1 ♀, Khandak, 5.i.1915 (*H. H. King*). KENYA: 2 ♂, Kiambu, ex *Spodoptera exempta*, 12–17.vii.1963 (*E. S. Brown*). ARABIA: 4 ♂, 2 ♀, Jedda, ex *Celerio livornica*, ii.1946 (*R. E. Ellison*).

All above-listed material in British Museum (Natural History).

Palexorista sp.

The British Museum collection contains a few specimens of an unidentified species of *Palexorista*, possibly new, from Aden and Cyprus: attention is drawn here to these specimens as it is possible that the same species may occur in the Oriental Region or in Africa. The species concerned has the bifurcate type of aedeagus, large hair-patches on the male abdomen, the antennal axis far above the ocular axis, and lacks black setulae behind the postocular row; these characters indicate that it is closely allied to *P. imberbis* and *P. zonata*, but it differs from these and related species in having exceptionally long and very slender paralobes in the male genitalia. The paralobes bear a few strong spinules at the extreme tips. The data of the specimens seen are as follows:

ADEN: 1 ♂, 1 ♀, S. Othman, 17.iii.1895 (*C. G. Nurse*); 1 ♂, 1 ♀, Aden, 5 and 18.iii.1895 (*C. G. Nurse*). CYPRUS: 2 ♂, ex *Laphygma exigua* Hb., 3.x.1924 (*D. S. Wilkinson*).

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W. J. KNIGHT

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Pp. 99–201; 465 *Text-figs.*

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SYNOPSIS

The genus is redefined and distinguished from the closely related European genus *Erythria*. A review of all previous work on the genus is presented. The twenty-seven known species and five new species are described. Two major groups of species are recognized, the larger being found throughout the United States, Canada and the Palaearctic region, and the smaller being confined mainly to Mexico and the southwestern United States. Evidence for a Palaearctic origin of the genus, followed by a southerly movement through North America, is considered.

INTRODUCTION

THE genus *Dikraneura* Hardy is Holarctic in distribution, the majority of the species occurring in the Nearctic region. Although variously considered in the past by both American and European workers, such treatments have been confined to the Nearctic or Palaearctic region respectively, with little or no attempt to consider the genus throughout its entire range. This restricted approach has had its most deleterious effects on the understanding of the relationships of the European species which, without a consideration of the large number of species present in the New World fauna, have been incorrectly associated. The present paper is an attempt to correct this shortcoming and to arrive at a clearer definition and understanding of the genus.

The genus *Dikraneura* was first described by Hardy (1850*a*) for his species *variata* from the British Isles. Later, Walsh (1862*a*), in the United States, described the genus *Chloroneura*. Shortly afterwards, Fieber (1866*a*) described the genera *Notus* and *Erythria* from Europe which he later, in a catalogue of the European Homoptera (1872*a*), considered to be synonymous. Douglas (1875*b*), in a treatment of the British species, was the first to call attention to the relationship of Fieber's genera to *Dikraneura* when he placed *Notus* as a synonym of the latter and for the next twenty years both *Notus* and *Erythria* were accepted as synonyms of Hardy's genus in both Europe and the United States. During this period, new species were described from the British Isles (Douglas & Scott, 1876*a*; Edwards, 1885*a*; Buckton, 1891*d*), France (Rey, 1891*a*), Switzerland (de Carlini, 1887*a*) and the United States (Gillette, 1895*a*; Gillette & Baker, 1895*a*). Puton (1875*a*) in a catalogue of the European Hemiptera, referring erroneously to the genus as *Notus*, split it into two subgenera, *Erythria* and *Notus*, with *Dikraneura* as a synonym of the latter. In his later catalogue of the Palaearctic Hemiptera Puton (1886*b*) corrected this mistake by giving Hardy's name its rightful position as senior synonym. He retained his previous division of the genus, with *Notus* as a synonym of the nominate subgenus, and listed twenty-three species for the genus in this region. Van Duzee (1894*a*), in a catalogue of the Jassoidea of North America, listed only two species for that continent, neither of which were present in Europe.

Melichar (1896*a*), in a study of the Homoptera of middle Europe, raised *Erythria* once more to the level of genus with *Notus* remaining as a synonym of *Dikraneura*, a concept that was accepted by the vast majority of workers throughout Europe for the next forty years. Gillette (1898*a*) gave the first revision of the genus for the United States, rejecting Melichar's interpretation of the genus and retaining *Erythria* as a synonym. He described ten species for the genus including six new species. Puton (1899*a*) and Oshanin (1906*a* and 1907*a*) in catalogues of the Palaearctic Hemiptera, listed twenty-two species for the genus, this number being increased to twenty-four by Oshanin (1912*a*) in his later catalogue of the Palaearctic Hemiptera. New species were described in 1897 from Austria (Then, 1897*a*) and in 1900 from Siberia (Melichar, 1900*a*). A few years later, Baker (1903*c*) described four new species from Nicaragua which he considered to be congeneric with the European genus *Erythria* and the first indication of its presence in the New World. He followed the current European concept in viewing the genus as distinct from *Dikraneura* on the basis of general body shape. Two new species of *Dikraneura* were described from Australia (Kirkaldy, 1906*c*) and additional species were also added to the Palaearctic list from Germany (Haupt, 1912*a*) and Sachalin (Matsumura, 1911*b*). A new species was also described in 1914 from the United States (Van Duzee, 1914*a*). Van Duzee (1916*a*, 1917*b*), in revised catalogues of the Hemiptera of America north of Mexico, now listed twelve species for that continent, following the European concept of that time and listing *Notus*, on both occasions, as a synonym. Myers (1923*a*) described a new species from New Zealand and in 1924 additional species were described from the United States (DeLong, 1924*a* and McAtee, 1924*a*). The following year Ball & DeLong (1925*a*) published a further revision of the genus in North America in which they transferred three species, together with two new species, to a new genus *Alconeura* on the basis of the third apical cell of the fore wing. They described fourteen species for the genus *Dikraneura*, including three new species, and followed Van Duzee's 1917 catalogue in placing *Notus* as its synonym.

The Neotropical fauna was first studied by McAtee (1926*b*), who listed twelve species for the genus from that region, including descriptions of six new species. He relegated Ball & DeLong's genus *Alconeura* to a subgenus of *Dikraneura*, subdividing the latter into five subgenera, *Dikraneura*, *Notus*, *Alconeura*, *Kahaona* and a new subgenus *Hyloidea*, on the basis of the venation of the fore wings and the shape of the head. Two years later, Osborn (1928*a*), in a study of the Neotropical Homoptera of the Carnegie Museum, re-instated *Alconeura* as a distinct genus, an action followed by all subsequent workers. He divided *Dikraneura* into only two subgenera, *Dikraneura* and *Hyloidea*, and described eighteen new species in the former and twelve new species in the latter. He also described another new species from Ohio (Osborn, 1928*b*). A closely related new genus, *Liguropia*, with only one included species, was described from Italy in 1930 by Haupt (1930*a*) and in the same year Lawson (1930*e*) described eight new species of *Dikraneura* from North America. A further species of *Dikraneura* was described in 1934 from North America by Beamer (1934*b*) and an additional two species from the United States in 1936 (Beamer, 1936*a*). Osborn (1935*a*), in a study of the insects of Puerto Rico and the Virgin Islands, described another new species of *Dikraneura*, following his earlier (Osborn, 1928*a*) paper by subdividing the genus into the subgenera *Dikraneura* and *Hyloidea*. DeLong & Caldwell (1936*a*), using characters in the genital plates of the males, separated off and described for the United States a new genus *Forcipata*.

Ribaut (1936*b*), in his classic work on the French Homoptera, studied the group in that country from the point of view of the male internal genitalia, which had not previously been used to any great extent by taxonomists. He revised the earlier concepts of the genus and placed *Erythria* once more, together with *Liguropia*, as synonyms of *Dikraneura*, elevating *Notus* to the level of genus. He described two new species from France and arranged the eighteen included species into seven groups on the basis of the male genitalia, one of the groups being equivalent to DeLong & Caldwell's genus *Forcipata* in America. This new interpretation of the relationship between *Dikraneura*, *Erythria* and *Notus* displaced the earlier one proposed initially by Melichar (1896*a*) and has been followed since then by the majority of workers in Europe and later (Oman, 1949*a*; Young, 1952*b*) in America. At about the same time, DeLong & Caldwell (1937*a*) presented a third revision of the genus for North America, basing their studies likewise on the male internal genitalia. Unlike Ribaut however, they retained *Notus* as a synonym of *Dikraneura*, which they divided into three subgenera, *Dikraneura*, *Notus* and a new subgenus *Curta*. They elevated *Hyloidea* for the first time to the level of genus, comparable to *Alconeura* and *Forcipata*, separating all four genera on the basis of shape, venation and external male genitalia. They described thirty-three species for *Dikraneura* in North America, including twelve new species. Later, in their check-list of America north of Mexico (DeLong & Caldwell, 1937*c*) they listed thirty-five species. In the same year, Oman (1937*d*) described two new species from Puerto Rico and in the following year Cerutti (1938*a*) described a further one from Switzerland. Lindberg (1941*b*) described a new species from the Azores in 1941 and in 1943 Beamer (1943*b*) described twelve new species from the United States, a further one being added by him in 1945 (Beamer, 1945). In a further check-list of America north of Mexico, DeLong & Knull (1945) listed fifty species for the genus at that time. As an indication of the cosmopolitan nature of the genus as then understood, Metcalf (1946) gave the total number of species as seventy-seven, with thirty-six Nearctic, fourteen Palaearctic, thirteen Neotropical, eleven Caribbean, two Australian and one Maorian. Oman (1947*b*), after a consideration of DeLong & Caldwell's subgenus *Curta*, placed it as a synonym of the subgenus *Notus* Fieber, which at that time was still considered in America to be synonymous with *Dikraneura*. It was not until two years later that Oman (1949*a*), in a generic classification and check-list of Nearctic leafhoppers, elevated *Notus*, for the first time in the United States, to the rank of genus, thereby bringing the American species in line with the European concepts put forward by Ribaut. In this same work he split the genus *Dikraneura* into three genera, *Dikraneura* itself plus the new genera *Kunzeana* and *Dikrella*, on the basis of the relative length of the fourth apical cell of the fore wing, and thereby reduced the number of North American species to twenty-five. Beirne (1952*b*), in a study of the leafhoppers of western Canada, described two new species from that area while Caldwell & Martorell (1952*a*) in the same year, reverting to Osborn's (1928*a*, 1935*a*) concept of the genus as divided into the subgenera *Dikraneura* and *Hyloidea*, described four new species from Puerto Rico.

The first attempt to review the entire range of species in the Americas was made by Young (1952*b*) in his reclassification of the Western Hemisphere Typhlocybinae. Using previously neglected characters of the male internal genitalia and the basal veins of the hind wings, he split the genus *Dikraneura*, as hitherto conceived, into several new genera, thereby producing a more realistic concept of Hardy's genus, which was consequently found to be confined in that hemisphere to North America and Mexico. He listed eighteen species for the New World, dividing them between two subgenera, *Dikraneura* and a new subgenus *Delongia*, the latter containing only a single species differing from the majority by the shape of the male connective and minor variations in both the fore and hind wing. Like Oman (1949*a*), he followed Ribaut in considering *Notus* as a distinct genus and transferred DeLong & Caldwell's subgenus *Curta* as its synonym as indicated earlier by Oman (1947*b* and 1949*a*). McAtee's subgenus *Hyloidea* was relegated once more from the level of genus, to which it had been raised by DeLong & Caldwell (1937*a*), and transferred by Young to *Alconeura* as a subgenus of the latter. The species described from Central America as *Erythria* by Baker (1903*c*) were found to be other than Fieber's genus, which apparently does not occur in the western Hemisphere. Since Young's paper, additional species have been described from Mexico (Ruppel & DeLong, 1953*e*; Borland, 1955*a*) and Siberia (Linnavuori, 1953*a*).

Two common emendations of the name appear throughout the literature. Douglas (1875*b*) emended the name of the genus to *Dicranoneura* and referred to it by this name in his subsequent papers (Douglas & Scott, 1876*a*; Douglas, 1879*a*, *b*). Edwards (1885*a*) was the only worker to accept this emendation as correct and even he discarded its use in his later works (Edwards, 1888*d*, 1890, 1896*b*, 1908). It appears infrequently in the literature, as a synonym of *Dikraneura* (Puton, 1875*a*; Van Duzee, 1917*b*; Schulze, Kükenthal & Heider, 1928*b*; Ribaut, 1936*b*; Neave, 1939*b*; China, 1943*a*, 1950*a*; Kloet & Hincks, 1945*a*) or clearly considered as an erroneous emendation (McAtee, 1918*a*, 1934*a*; Oman, 1949*a*). Evans (1947*a*) mistakenly assumed that Douglas intended a new genus when he first used the name *Dicranoneura* and consequently selected *Cicadula citrinella* Zett., an originally included species, as the type. That this was not Douglas' intention is clearly indicated by the fact that in his first and subsequent use of the name he gives *Dikraneura*

Hardy, 1850, and *Notus* Fieber, 1865, as synonyms and includes *variata* in the list of species. He also states (1879*b*)

> " The genus *Dicranoneura*, or, as Hardy imperfectly wrote it, " *Dikraneura* ", appears not to be accepted on the continent, vice *Notus* Fieber (1866), although it is identical and dates from 1850. The character of the neuration of the type, *D. variata*, . . . "

This clearly indicates that Douglas used the name purely as an emendation rather than for any other reason. Young (1952*b*) however accepted Evans' interpretation and, on the basis of his type designation, reinstated *Dicranoneura* Douglas as the correct name for *Forcipata* DeLong & Caldwell. His action is criticized by Metcalf (1953*c*) with whom the present writer is in agreement. Metcalf's inference however regarding the absence of *Dikraneura* as a synonym in Douglas' 1875*b* paper and his statement regarding the omission of *variata* as an originally included species would appear to be incorrect.

The genus *Dikraneura* was also erroneously referred to as *Dicraneura* by Puton (1886*b*), a mistake which has been perpetuated by both European and American workers. Kirkaldy (1901*a*, *f*) was the first to call attention to this error and states, in the latter paper,

> " It does not seem to be generally known that Hardy's genus was *Dikraneura* (not *Dicraneura* as usually spelt) ".

His observation, however, appears to have passed unnoticed by the majority of workers at that time since it was not until about the time of Van Duzee (1917*b*) that the correct spelling first appeared in the American literature since when it has, with few exceptions, been predominantly used. In Europe however, apart from an isolated instance (Edwards, 1908), the correct spelling does not appear to have been used until Lindberg (1924*a*), since when both spellings have been applied to an equal extent.

The genus *Chloroneura* was first described by Walsh (1862*a*) for his three new species *abnormis*, *malefica* and *maligna*. In the absence of an originally designated type-species, the genus has been variously considered, either as a synonym of *Empoasca* (Woodworth, 1889*a*; Van Duzee, 1894*a*; Melichar, 1903*b*; Distant, 1908*g*; Ball, 1924*a*; Ball & DeLong, 1925*a*), a synonym of *Dikraneura* (Van Duzee, 1916*a*, 1917*b*; DeLong, 1923*a*), a synonym in part of both *Dikraneura* and *Empoasca* (McAtee, 1918*a*) or even as a distinct genus (Ashmead, 1904*a*). It was not until McAtee (1934*a*) clearly designated the originally included species *abnormis* as its type-species that it became accepted as a synonym of *Dikraneura*.

MORPHOLOGY

The morphology of the Cicadellidae has been dealt with in detail by Ribaut (1936*b*, 1952*a*), Singh-Pruthi (1925*b*, 1929), Evans (1946*a*, 1946*b*, 1947*a*), Oman (1949*a*), Kramer (1950*a*) and Ossiannilsson *et al.* (1956). In the present study, attention has been focused on such structures of the head, thorax, wings and abdomen that provide diagnostic characters of use in delimiting both the genus and the individual species. Segregation of the latter is facilitated in the main by characters of the male genitalia, supported in many species by the male abdominal apodemes, the shape of the head, colour and size.

The members of the genus *Dikraneura* are narrow and elongate in shape, varying in length from 2·92 mm. to 4·64 mm. The head is wider or narrower than the thorax and is angularly produced in the majority of species, the extent varying between and sometimes within species. The dorsal surface of the head, referred to as the crown or vertex, is divided along the medial line over its posterior region by a short coronal suture. The face is recurved ventrally at an angle of approximately 45° to the vertex, the margin between the two being broadly or narrowly rounded. The face, including the eyes, is usually as long as wide, but may in a few species be wider than long. Its surface is moderately convex. Its margin bordering the vertex is referred to here, unlike Evans (1947*a*), as the anterior margin whilst that from which the stylets arise as the posterior margin.

The medial area of the face, the frontoclypeus, decreases in width towards the apical anteclypeus, the suture between the two being absent or obscure. A transverse epistomal suture, separating the components of the frontoclypeus, is absent and the clypeal suture bordering it on each side extends for only a short distance beyond the antennae as the frontal suture. Postfrontal sutures, which delimit the posterior border of the frontoclypeus and connect medially with the anterior end of the coronal suture, are absent. The margin of the head between the vertex and face, however, possesses two independent parentheses-like sutures, the homologies of which are unknown. Ocelli are absent. Bordering the junction between the frontoclypeus and anteclypeus on each side is a small, crescent-shaped sclerite, the lorum. The lateral areas of the face are composed of the fused maxillary plate and gena which are here referred to jointly as the gena. The antennae are situated on the face midway between the anterior and posterior corners of the eye in the narrow region between the latter and the frontoclypeus known as the ocellocular region, the relative width of which varies within the genus. Antennal ledges, located immediately above the antennae, are absent.

The parts of the thorax visible in dorsal view are the pronotum, situated anteriorly and belonging to the prothorax and the smaller triangular shaped scutellum belonging to the mesothorax. The pronotum is usually wider than long and varies only slightly in shape between species. Its lateral margins are of moderate length, either parallel or slightly divergent posteriorly, and are broadly rounded to a shallowly concave posterior margin.

The fore wings are long and narrow, with their venation considerably reduced and devoid of cross veins basad of the apical cells as in other members of the subfamily. The four apical cells are long and narrow with the bases of the first, second and third truncate and progressively more distad. The fourth, or outer apical cell, extends more basad than the other three. No marked variation occurs between species.

In the hind wings, a submarginal vein extends from the jugal lobe, at the base of the wing, around the apex and basad along the costal border to approximately one-third the distance from the apex to the base of the latter. Vein R is united with the anterior branch of vein M near its apex and enters the submarginal vein as vein

$R + M$. Vein M_{3+4}, the posterior branch of vein M, is united with vein Cu_1 by a short cross vein, *m-cu*, in such a way that Cu_1 itself appears to be branched, the base of M_{3+4} appearing as the cross vein. Vein *m-cu* is sometimes very short or absent so that M_{3+4} appears to touch Cu_1 before proceeding to the apex. Vein Cu_2 is unbranched and enters the submarginal vein level with *m-cu*. Veins 1*v* and 2*v* are fused basally. As in the fore wing, no variation occurs between species.

The first two segments of the abdomen are considerably reduced as in all members of the Auchenorrhynchous Homoptera. In the genus *Dikraneura*, the sternite of the second segment in the male is produced internally as a pair of dorsoventrally flattened finger-like processes, the sternal or abdominal apodemes, which project posteriorly and are variously developed and diagnostic in different species. They serve for the attachment of muscles associated with the sound producing organs and their variation between species is a possible reflection of the differences in mating call, an ethological barrier in the reproductive isolation of the species.

In the male, the tergum and pleura of the IXth abdominal segment are modified as two lateral plates, continuous dorsally at their anterior ends, and terminating posteriorly on each side in the majority of species in a long variously directed finger-like process. They are referred to collectively as the pygofer, or pygophore, which is diagnostic for the species or species-groups within the genus. The incomplete dorsal fusion of the two halves provides a deep posterior emargination for the reception of the reduced Xth and XIth segments which are referred to respectively as the anal tube and anal style. The pygofer is fused ventrolaterally at its anterior end to the sternite of the IXth segment, or genital valve, and is closed ventrally by a pair of triangular genital or subgenital plates which articulate laterally at their base with the pygofer, the entire structure being referred to as the genital capsule. The subgenital plates offer little of diagnostic value for the separation of species. Situated ventrally within the capsule is a medial U-shaped basal plate, or connective, which articulates on each side with an elongate style, or paramere, and medially with the base of the aedeagus of which it is strictly a part. The styles, each articulating laterally with its respective subgenital plate, are of a uniform pattern for the genus and, together with the connective, offer little in the way of diagnostic species characters. The aedeagus, a composite term which comprises the fused phallobase and distal tubular aedeagus proper, consists in general of an anteroventral prolongation, the preatrium, which articulates with the connective, a basal dorsally directed apodeme for muscle attachment and a variously shaped and ornamented distal prolongation, the shaft. The latter carries the gonoduct, or endophallus, which opens at its distal end by means of the gonopore or phallotreme. The appearance of the aedeagus is diagnostic for each species and is one of the main characters used in their separation.

In the female, the last or VIIth abdominal sternum is variously shaped along its posterior margin and offers characters of diagnostic value in certain species. The pygofer, or IXth tergum, consists of a large, dorsally continuous, plate-like structure on each side of the ovipositor. The ovipositor itself is a long narrow median structure situated ventrally between the two halves of the pygofer. It consists of three pairs of valvulae, the first or anterior pair representing the VIIIth segment, and the second or inner and the third or lateral pair representing the IXth segment. The latter pair act as an outer sheath for the other two. Apart from the VIIth sternite, the female genitalia offer little in the way of external diagnostic species characters.

TECHNIQUES

The methods used in the present study are as given by Knight (1965).

All measurements were made with the aid of a moving wire micrometer eyepiece. Body length was measured from the tip of the vertex to the apical margin of the fore wings with the latter in the position of rest alongside the body. The length of the vertex was measured along the medial line and compared with the length adjacent and parallel to the inner margin of the eye ("length next eye"). The width of the ocellocular area was measured from the inner margin of the eye to the frontal suture in a direct line above and tangential to the antennal fossa.

Colour in all cases was examined beneath a binocular microscope with the aid of a 6 volt, 30 watt tungsten filament spot-light.

ECONOMIC IMPORTANCE

The genus *Dikraneura* is found mainly on plants of the family Gramineae, although certain species have been recorded on such other economic plants as alfalfa, clover, beets, potatoes, cherry, peach and apple. Records of economic damage are limited to the species *D. carneola* (Stål), *D. absenta* DeLong & Caldwell, *D. abnormis* (Walsh) and *D. mali* (Provancher), principally in the case of grasses and grain crops such as wheat, oats, barley, rye and sweet corn. In addition, *D. carneola* and *D. absenta* have been recorded as causing economic damage to clover and alfalfa while the first of these species has been found to transmit Western X-disease virus of stone fruits. Full details of the known host range and economic importance are included under each species.

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The results of this work were embodied in a thesis submitted for the degree of Doctor of Philosophy in the Graduate School of North Carolina State University. With the approval of the Director of Research, this material has been used as the basis for the studies of the Nearctic species of *Dikraneura* in the present work, recorded as Journal Series No. 2368 of the Experiment Station, North Carolina State University.

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DIKRANEURA Hardy

Dikraneura Hardy, 1850*a* : 423.
Chloroneura Walsh, 1862*a* : 149 (Type-species: *Chloroneura abnormis* Walsh by subsequent designation of McAtee, 1934*a*).
Dicranoneura Douglas, 1875*b* : 27 [emendation].
Dicraneura Puton, 1886*b* : 86 [emendation].
Dicroneura [*sic*] Woodworth, 1888*b* : 75.
Dicranura [*sic*] Buckton, 1891*d* : 101.
Dieraneura [*sic*] Ikuma, 1903*a* : 190.
Piaraneura [*sic*] Ikuma, 1903*a* : 190.
Dikrancura [*sic*] Ribaut, 1936*b* : 198.
Dikraneura (*Notus*) DeLong & Caldwell, 1937*a* : 22.
Dikraneura (*Chloroneura*) Medler, 1943*a* : 124.

Type-species, *Dikraneura variata* Hardy, 1850, by monotypy.

Small, elongate species, yellow or yellowish green in colour, with or without two red longitudinal vittae.

Head narrower or wider than pronotum, sometimes equal; vertex moderately produced with apex obtusely or acutely angled, rarely of uniform length with anterior and posterior margins parallel, coronal suture short, surface slightly convex, broadly or narrowly rounded to face; ocelli absent; face convex, as long as or slightly longer than wide, rarely wider than long, lateral margin slightly concave beneath eyes; frontoclypeus long and narrow, decreasing gradually in width towards anteclypeus, frontal sutures extending beyond antennae to near level of anterior margin of eye, epistomal and postfrontal sutures absent; a crescent-shaped suture on anterior margin of head on each side of apex, midway between latter and eye; anteclypeus increasing in width towards its apex, the latter rounded and extending beyond margin of face, continuous with frontoclypeus or separated by only slight transverse depression; antennae situated midway between anterior and posterior corner of eye, ocellocular area equal in width to antennal fossa, rarely greater, antennal ledges absent.

Pronotum wider than long, with lateral margins moderately long, parallel or slightly divergent posteriorly, broadly rounded at posterolateral angles, posterior margin shallowly concave.

Fore wings with apical cells long and narrow, the truncate bases of cells 1–3 progressively more distad, fourth apical cell with base level with or slightly basad of that of first. Hind wings with submarginal vein extending around apex and then basad along costal margin; vein *R* fused distally with anterior branch of vein *M*; posterior branch of vein *M* united near its base with vein Cu_1, the latter appearing branched apically; vein Cu_2 reaching submarginal vein approximately level with junction of veins *M* and Cu_1; the two vannal veins united along their basal half.

A pair of abdominal apodemes arising from second sternite in males, spatulate, variable in length, directed posteriorly.

Male pygofer with well developed posterior process usually present, with numerous setae and sometimes microspines over posterior half of lateral wall, fused anteriorly with valve; subgenital plates triangular, dorsoventrally flattened with lateral edge thickened along apical half, a uniseriate row of spine-like setae along ventrolateral edge, the basal ones usually much longer than those along apical half, lateral edge with numerous setae of variable length. Connective U-shaped. Styles elongate, broadly lobed and truncate posteriorly with lateral edge turned dorsad, a stout subapical process arising dorsally from mesal edge of lobe, its apex directed posteriorly. Aedeagus with preatrium long or short, basal apodeme well developed, shaft with paired apical or subapical processes usually present, additional paired processes usually present along its length, gonopore on posterior margin, rarely apical.

Female seventh sternum entire, wider than long, with posterior margin usually convex, sometimes concave medially and occasionally sclerotized marginally.

Dikraneura Hardy is distinguished from the closely related European genus *Erythria* Fieber (type-species, *Erythria aureola* (Fall.)) mainly by the shape of the connective, which is T-shaped or sometimes plate-like in the latter. All European species previously placed in *Dikraneura*, with the exception of *D. variata* Hardy and *D. aridella* (Sahlberg), consequently belong in Fieber's genus which will be dealt with in a later paper.

Key to Species (males only)

1 Pygofer processes recurved dorsolaterally (Text-fig. 9), rarely straight and directed dorsally (Text-fig. 216), without additional processes or teeth, pygofer processes elongate, sometimes reduced (Text-fig. 245); aedeagus with a pair of posteriorly directed apical or subapical processes always present (additional anteriorly or dorsally directed processes on shaft usually present) . 2

– Pygofer processes recurved antero- or dorsomesally (Text-fig. 381), rarely straight and directed posteriorly (Text-fig. 457), teeth or additional processes usually present, if absent then aedeagus not as above, pygofer processes elongate (Text-fig. 307) or short and robust (Text-fig. 320), rarely absent (Text-figs. 428 and 447); aedeagus usually without a pair of posteriorly directed apical or subapical processes, if present then pygofer processes absent or with teeth (additional anteriorly or ventrally directed processes on shaft usually present) 20

2 (1) Pygofer with prominent convexity dorsally, immediately basad of posterior process (Text-fig. 8) 3

– Pygofer without convexity at base of posterior process (Text-fig. 214), or if present then only weakly developed (Text-figs. 180 and 247) . . . 13

3 (2) Aedeagus with single pair of apical processes, simple, directed posteriorly at least apically (Text-figs. 40, 79 and 128) 4

– Aedeagus with one or two pairs of apical or subapical processes, single pair when present bifurcating into an H-shaped or X-shaped structure (Text-figs. 140, 153 and 165) 11

4 (3) Aedeagus with apical processes expanded basally into a flattened shield-like plate (Text-figs. 105, 116 and 129) . . . 5

– Aedeagus with apical processes simple, not expanded basally into a shield-like plate (Text-figs. 12, 41 and 92) . . . 7

5 (4) Apical processes beyond basal expansion long and thin (Text-figs. 116 and 129) . . . 6

– Apical processes beyond basal expansion short, with length subequal to width (Text-fig. 105) . . . ***shoshone*** DeLong & Caldwell (p. 134)

6 (5) Aedeagus with shaft straight, directed dorsally (Text-fig. 115); pygofer with expansion at base of posterior process decreasing gradually in height posteriorly, its basal width approximately twice its height, with microspines and hair-like setae posterolaterally (Text-fig. 114) . . . ***ossia*** Beirne (p. 136)

– Aedeagus with shaft arched posteriorly (Text-fig. 130); pygofer with expansion at base of posterior process decreasing abruptly in height posteriorly, its basal width subequal to its height, with elongate spine-like setae posterolaterally (Text-fig. 127) . . . ***hungerfordi*** Lawson (p. 138)

7 (4) Abdominal apodemes each with length approximately twice width (Text-fig. 97); aedeagus with processes arising laterally on shaft near midlength (Text-fig. 91) . . . ***omani*** sp. n. (p. 132)

– Abdominal apodemes each with length subequal to width (Text-figs. 10 and 81); aedeagus with processes arising posterolaterally near apex (Text-fig. 40), or absent . . . 8

8 (7) Aedeagus with posterolateral processes present . . . 9

– Aedeagus with posterolateral processes absent ***absenta*** DeLong & Caldwell (p. 126)

9 (8) Aedeagus with posterolateral processes extending anteriorly beyond anterior margin of shaft to near level of posterior margin of basal apodeme (Text-fig. 79) . . . ***aridella*** (Sahlberg) (p. 130)

– Aedeagus with posterolateral processes extending anteriorly but not exceeding level of anterior margin of shaft (Text-figs. 11 and 40) . . . 10

10 (9) Aedeagus in lateral aspect with width of shaft immediately distad and basad of gonopore subequal (Text-figs. 11 and 17–29); pygofer with microspines over posterior region of lateral wall; abdominal apodemes directed posteriorly, spatulate (Text-fig. 10) . . . ***variata*** Hardy (p. 114)

— Aedeagus in lateral aspect with width of shaft immediately distad of gonopore approximately one-half width immediately basad of gonopore (Text-figs. 40 and 46–58); pygofer without microspines over posterior region of lateral wall; abdominal apodemes directed dorsally, spoon-shaped (Text-fig 39) . . . ***carneola*** (Stål) (p. 120)

11 (3) Aedeagus with one pair of laterally directed bifurcate apical processes, a pair of processes arising laterally on shaft just basad of apex (Text-figs. 152 and 153) . . . 12

— Aedeagus with 2 pairs of subapical processes, one directed anteriorly and the other posteriorly, without lateral processes on shaft (Text-fig. 165) ***urbana*** Ball & Delong (p. 145)

12 (11) Aedeagus elongate with length of shaft distad of gonopore approximately three times width at gonopore, apical processes appearing H-shaped in dorsal aspect (Text-figs. 152 and 153) . . . ***etiolata* sp. n.** (p. 143)

— Aedeagus robust with length of shaft distad of gonopore subequal to its width at gonopore, apical processes appearing X-shaped in dorsal aspect (Text-figs. 139 and 140) . . . ***abnormis*** (Walsh) (p. 140)

13 (2) Pygofer with posterior processes elongate, their length 4–5 times their basal width, clearly demarcated (Text-fig. 180) . . . 14

— Pygofer with posterior processes very short, their length approximately two times their basal width, merging with pygofer and not clearly demarcated (Text-fig. 263) 18

14 (13) Abdominal apodemes each with length subequal to width (Text-fig. 191); aedeagus with apical processes expanded basally into large plate-like structure (Text-fig. 181) . . . . ***rubrala*** DeLong & Caldwell (p. 148)

— Abdominal apodemes each at least twice as long as wide (Text-fig. 203); aedeagus with apical processes not expanded basally (Text-figs. 202 and 240) 15

15 (14) Pygofer with detached, elongate sclerite situated in membrane dorsomesad of base of posterior process (Text-fig. 198) ***arizona*** DeLong & Caldwell (p. 150)

— Pygofer without detached sclerite at base of posterior process 16

16 (15) Pygofer processes straight, directed dorsally (Text-fig. 216); aedeagus with subapical processes and with posterolateral processes triangular (Text-fig. 217) . . . . ***triangulata*** sp. n. (p. 153)

— Pygofer processes curved, their apices directed dorsolaterally (Text-fig. 231); aedeagus with apical processes and with lateral or posterolateral processes elongate (Text-fig. 228) 17

17 (16) Aedeagus with apical processes laterally compressed, a pair of shorter processes arising posterolaterally immediately basad of gonopore (Text-figs. 228 and 229) . . . . ***latacephala*** Beamer (p.155)

— Aedeagus with apical processes needle-like, a pair of shorter processes arising laterally near base of shaft (Text-figs. 239 and 240). ***ungulata*** Beamer (p. 157)

18 (13) Aedeagus with posterior margin terminating in an acute, medial, spine-like process; lateral or posterolateral processes arising basad of gonopore (Text-figs. 248 and 265) 19

— Aedeagus without spine-like process at apex of posterior margin; posterolateral processes arising alongside distal half of gonopore (Text-fig. 282) . ***rubica*** Delong & Caldwell (p. 164)

19 (18) Aedeagus with anterior processes near midlength of shaft very short and broadly triangular, much wider basally than long, a pair of elongate processes arising posterolaterally on shaft immediately basad of gonopore (Text-fig. 248); abdominal apodemes each with length approximately 1½ times width (Text-fig. 256) . . . . . . ***retusa*** Beamer (p. 159)

— Aedeagus with anterior processes near midlength of shaft long and spine-like, 2–3 times longer than wide, a pair of elongate processes arising laterally on shaft near midlength but not immediately basad of gonopore (Text-fig. 265); abdominal apodemes each with length 3 times width (Text-fig. 276) . . . . ***rufula*** Gillette (p. 160)

20 (1) Pygofer with posterior processes elongate or short and robust, recurved dorsomesally or anteromesally, with or without teeth or additional processes (Text-figs. 302 and 320); vertex and pronotum with two longitudinal red vittae, rarely indistinct 21

— Pygofer with posterior processes absent or short and directed posteriorly, never recurved, without teeth or additional processes (Text-figs. 431 and 457); vertex and pronotum without two longitudinal red vittae. . . . 31

21 (20) Aedeagus with two pairs of processes arising from posterior margin near midlength (Text-fig. 371); pygofer process with an elongate process arising dorsally anterior to recurved portion, teeth absent (Text-fig. 370) ***stonei*** Ruppel & DeLong (p. 176)

— Aedeagus with only one pair of processes near midlength or absent (Text-fig. 294); pygofer processes without an elongate process anterior to recurved portion, teeth present or absent 22

22 (21) Pygofer with posterior processes elongate, without teeth, or limited to a single one near base (Text-figs. 293 and 297); aedeagus with a laterally compressed nose-like projection on posterior margin near midlength immediately basad of posterolateral processes, without paired apical processes (Text-figs. 294–296) . . . . ***vittata*** Borland (p. 166)

— Pygofer with posterior processes elongate or short and robust, with teeth, if elongate then teeth numerous (Text-figs. 307 and 320); aedeagus without projection near midlength of posterior margin, with or without paired apical processes 23

23 (22) Aedeagus directed dorsally or posterodorsally with a pair of elongate processes arising from posterior margin of shaft near midlength immediately basad, distad or laterad of gonopore, visible in posterior aspect (Text-figs. 322 and 359) 24

— Aedeagus directed posterodorsally with a pair of elongate processes arising from lateral margin of shaft near midlength, not or rarely visible in posterior aspect, if visible then situated distad of gonopore by distance at least equal to their length (Text-figs. 384 and 409); or aedeagus S-shaped with apex turned ventrally and with lateral processes short, widely based and flap-like (Text-fig. 419) 28

24 (23) Aedeagus with a large rugose lobe on each side at base of shaft (Text-fig. 311) ***serrata*** DeLong & Caldwell (p. 168)

— Aedeagus without a large rugose lobe on each side at base of shaft . . . 25

25 (24) Aedeagus with a pair of short apical or subapical processes directed anteriorly or posteriorly (Text-figs. 336 and 359) 26

— Aedeagus without a pair of short apical or subapical processes (Text-fig. 322) ***beameri*** Borland (p. 170)

26 (25) Aedeagus with apical processes narrow and directed anterodorsally, midshaft processes directed anteriorly (Text-fig. 336) 27

— Aedeagus with subapical processes triangular and directed posteriorly, midshaft processes directed ventrally (Text-fig. 359) ***halberda*** Ruppel & DeLong (p. 175)

27 (26) Aedeagus with distal half of shaft approximately twice as wide in lateral aspect as basal half, posterior processes arising immediately laterad of gonopore (Text-fig. 336); abdominal apodemes narrow, each 3 times as long as wide, separated by distance greater than their individual width (Text fig. 344) ***jalapensis*****,** sp. n. (p. 171)

— Aedeagus with distal and basal half of shaft of subequal width, posterior processes arising immediately basad of gonopore (Text-fig. 348); abdominal apodemes wide, each approximately twice as long as wide, separated by distance equal to one third their individual width (Text-fig. 353) ***dreisbachi*** sp. n. (p. 173)

28 (23) Aedeagus with shaft S-shaped in lateral aspect (Text-fig. 419) . . . ***ardea*** Ruppel & DeLong (p. 185)

— Aedeagus with shaft elongate, straight or slightly curved but never S-shaped (Text-fig. 384) 29

29 (28) Aedeagus with lateral processes visible in posterior aspect (Text-fig. 410) ***arcta*** DeLong & Caldwell (p. 183)

— Aedeagus with lateral processes not visible in posterior aspect (Text-fig. 385) . 30

30 (29) Pygofer process with teeth on posteroventral surface of elbow (Text-fig. 396); abdominal apodemes wide, separated by distance approximately one-third their individual width, parallel, each approximately 2½ times as long as wide (Text-fig. 406) . . . . ***torta*** DeLong & Caldwell (p. 181)

— Pygofer process without teeth on posteroventral surface of elbow (Text-fig. 382); abdominal apodemes narrow, separated basally by distance equal to their individual width, divergent, each approximately 4 times as long as wide (Text-fig. 391) . . . . . . ***angustata*** Ball & DeLong (p. 178)

31 (20) Pygofer with posterior process short, directed posteriorly; subgenital plates each with a sclerotized tooth situated subapically on dorsal surface (Text-fig. 457) . . . . ***denticulata*** sp. n. (p. 193)

— Pygofer without posterior process; subgenital plates without sclerotized tooth (Text-figs. 431 and 442) 32

32 (31) Aedeagus with only one pair of apical processes (Text-fig. 445) ***mali*** (Provancher) (p. 189)

— Aedeagus with two pairs of apical processes (Text-fig. 432) ***robusta*** Lawson (p. 186)

DESCRIPTIONS OF SPECIES

Dikraneura variata Hardy

(Text-figs. 1–29)

Dikraneura variata Hardy, 1850*a* : 423.
Notus luteolus Fieber, 1872*a* : 14 [nom. nud.]
Notus agnatus Fieber, op. cit. : 14 [nom. nud.]
Notus agnatus Lethierry, 1874*a* : 273.
Dikraneura lenensis Linnavuori, 1953*a* : 116. **syn. n.**

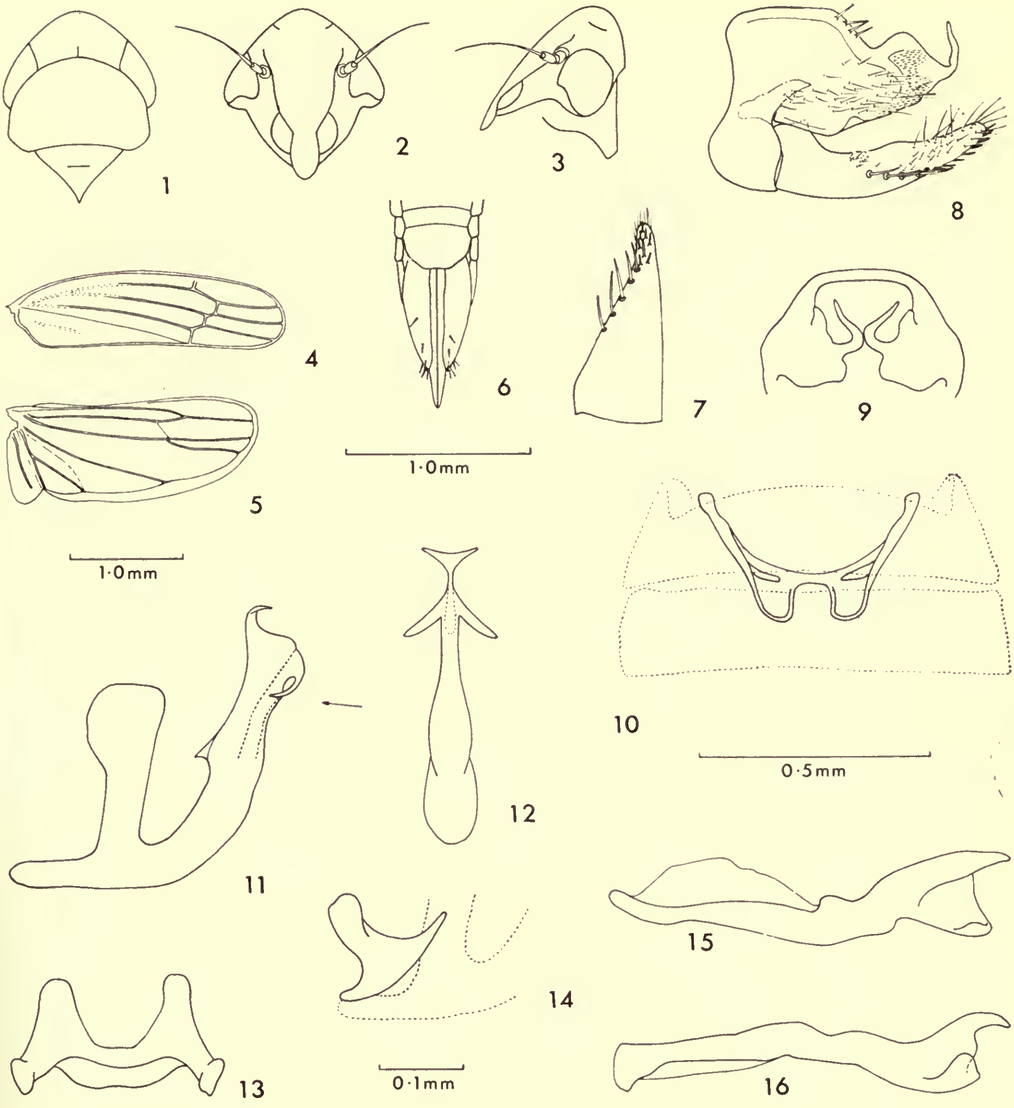
Length: ♂ 2·92–3·64 mm. (mean 3·20 mm.). ♀ 3·22–4·08 mm. (mean 3·58 mm.).

Head with width greater than that of pronotum, moderately produced with apex broadly rounded in dorsal aspect, medial length approximately $1\frac{1}{2}$ times length next eyes, broadly rounded to face with latter approximately as long as wide, ocellocular area $1\frac{1}{4}$ times width of antennal fossa; pronotum with width increasing only slightly posteriorly.

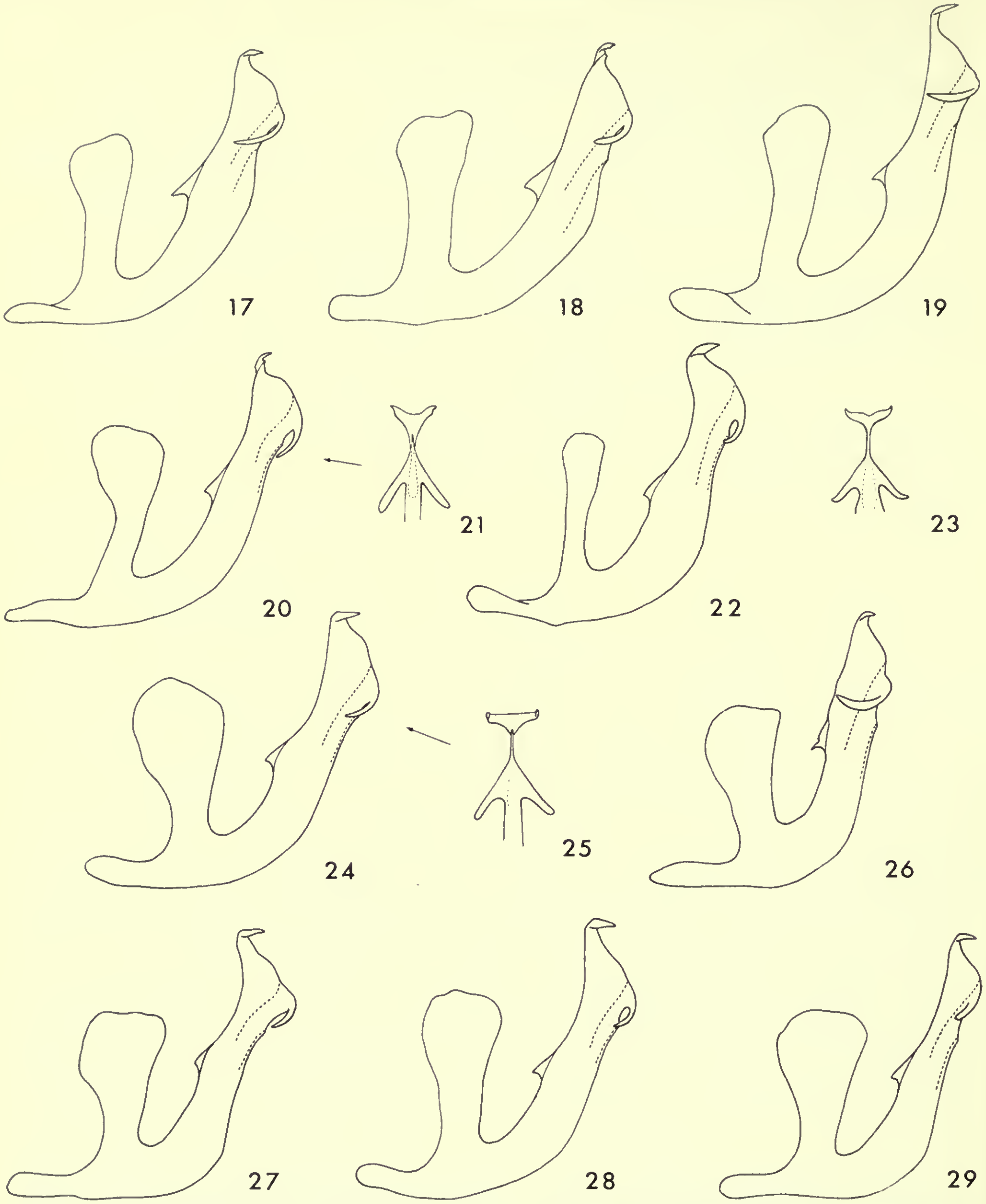
Colour of head sordid light brownish, paling to cream laterally on genae, with anteclypeus, medial area of frontoclypeus, and vertex sometimes washed with greenish yellow, a small patch above antenna whitish, sometimes indistinct, with marginal sutures yellowish or orange; vertex with narrow medial longitudinal stripe to near apex cream, absent or poorly developed in European specimens; eyes testaceous. Pronotum greenish yellow with discal area pale brownish or pale reddish brown, rarely deep red, lateral borders cream marked with yellow, medial line pale, sometimes indistinct; scutellum cream marked with yellow; remainder of thorax dark brown marked laterally with yellow. Legs pale stramineous. Fore wings with basal area subhyaline greenish yellow, sometimes pale, often sordid, rarely deep red; apical half hyaline smoky brown with veins yellowish. Hind wings hyaline with veins dark brown. Abdomen with dorsum and venter dark brown to black with lateral edges of former sometimes yellow, sternites with lateral and posterior margins often yellow or whitish yellow; male pygofer and anal tube dark brown, subgenital plates pale fawn, occasionally whitish or pale yellowish, valve dark brown or concolorous with plates; female pygofer cream with dorsal surface and apex of ovipositor beyond pygofer dark brown, sternum VII cream.

Male abdominal apodemes short, with length of each subequal to width, extending to near middle of fourth segment, sometimes absent.

Male genitalia with pygofer tapering posteriorly in lateral aspect and terminating in a narrow, finger-like process directed medially and then abruptly dorsolaterally, with a dorsal convexity immediately basad of process; dorsolateral margin with variable number of short spine-like setae near midlength; lateral wall with numerous randomly scattered setae over medial area, their length increasing posteriorly, with microspines over posterior area. Aedeagus with preatrium and dorsally directed basal apodeme well developed, the latter expanded apically; shaft directed dorsally, laterally compressed over apical half and tapering to a pair of laterally directed apical processes, their apices turned posteriorly; a pair of subapical processes on



FIGS. 1–16. *Dikraneura variata* Hardy. 1, head, pronotum and scutellum, dorsal view; 2, face; 3, head and pronotum, left lateral view; 4, fore wing; 5, hind wing; 6, female genitalia, ventral view; 7, left subgenital plate, ventral view; 8, male pygofer, valve and subgenital plates, left lateral view; 9, male pygofer, posterior view; 10, abdominal apodemes, dorsal view; 11, aedeagus (British Isles), left lateral view; 12, aedeagus, posterior view in direction of arrow in previous fig.; 13, connective, anterodorsal view; 14, connective, left lateral view; 15, left style, dorsal view; 16, left style, left lateral view. Scale as shown with head and female genitalia to same scale, male pygofer and abdominal apodemes to same scale and aedeagus, styles and connective to same scale.



FIGS. 17–29. *Dikraneura variata* Hardy. 17, aedeagus (Denmark), left lateral view; 18, same (Denmark); 19, same (Finland); 20, same (Mono Lake, California); 21, apex of aedeagus, posterior view in direction of arrow in previous fig.; 22, aedeagus (Saskatoon, Saskatchewan), left lateral view; 23, apex of aedeagus (Stirling, Alberta), posterior view; 24, aedeagus (Indian Head, Saskatchewan), left lateral view; 25, apex of aedeagus, posterior view in direction of arrow in previous fig.; 26, aedeagus (Lapine, Oregon), left lateral view; 27, same (Lapine, Oregon); 28, same (Saskatoon, Saskatchewan); 29, same (Lapine, Oregon). Scale as in figs. 11–16.

posterior surface, directed ventrolaterally and then anteriorly; a pair of short, acute, triangular processes on anterior surface of shaft near midlength; gonopore subapical on posterior margin between bases of posterior processes.

Female genitalia with posterior margin of sternum VII broadly rounded with medial sector transverse or slightly concave.

Distribution. BRITISH ISLES (Hardy, 1850*a*; Bold, 1867*a*; Norman, 1879*a*, 1880*a*; Cooke, 1882*a*; Edwards, 1884*c*, 1885*a*, 1896*b*; M'Gregor, 1893*a*, *b*; Morley, 1905*b*; Oshanin, 1906*a*; Butler, 1909*a*; Britten, 1919*a*; Brown, 1925*a*, 1937*a*; Thornley, 1934*a*; Roche, 1944*a*). FRANCE (Lethierry, 1874*a*; Reiber & Puton, 1880*a*; Dubois, 1888*a*; Dominique, 1890*a*, 1892*a*; Carpentier & Dubois, 1892*a*; Lambertie, 1901*a*, 1910*a*; Oshanin, 1906*a*; Ribaut, 1936*b*). BELGIUM (Lethierry, 1878*c*, 1892*b*; Fagel, 1949*a*). NETHERLANDS (Fokker, 1891*a*; Blöte, 1927*b*, *d*). DENMARK (Trolle, 1966). GERMANY (Melichar, 1896*a*; Oshanin, 1906*a*; Haupt, 1912*b*; Peus, 1928*a*; Wagner, 1935*a*, 1939*a*, 1941*a*; Kuntze, 1937*a*, *b*; Rabeler, 1951*a*). SWITZERLAND (Cerutti, 1939*a*). ITALY (Ferrari, 1882*a*, 1892*a*; Bezzi, 1893*a*; Cobelli, 1902*a*, 1909*a*). AUSTRIA (Then, 1886*a*; Melichar, 1896*a*; Oshanin, 1906*a*; Stichel, 1922*a*; Franz, 1943*a*). HUNGARY (Horvath, 1897*c*; Oshanin, 1906*a*; Dlabola, 1954*d*). CZECHOSLOVAKIA (Duda, 1892*a*; Spitzner, 1892*a*; Lang, 1945*c*; Dlabola, 1954*a*). ROUMANIA (Montandon, 1900*a*; Oshanin, 1906*a*). GREECE (Paganetti-Hummler, 1907*a*). TURKEY (Fahringer, 1922*a*). POLAND (Matsumura, 1906*a*; Nast, 1938*d*; Wagner, 1941*a*; Smreczynski, 1954*a*). W. RUSSIA (Oshanin, 1906*a*; Ivanov, 1928*b*). FINLAND (Oshanin, 1906*a*; Lindberg, 1924*a*, 1943*b*). UNITED STATES (Oman, 1949*a*).

Specimens seen. BRITISH ISLES: Scotland, Inverness, Aviemore, 11 ♂, viii.1939 (*P. Harwood*); England, Surrey, Holmbury, 1 ♂, viii.92 (*E. A. Butler*); England, Surrey, Shirley, 1 ♂, 29.ix.1900 (*W. West*); England, Somerset, Porlock, 2 ♂, 9.ix.56 (*W. J. LeQuesne*); England, Cornwall, Tintagel, 1 ♂, viii.08 (*E. A. Butler*); no locality, 2 ♂, no date (*Douglas Collection*). DENMARK: Kongshus, 11 ♂, 4 ♀, 21.ix.1915, 1 ♂, 2.viii.1915, 1 ♂, 1 ♀, 8.ix.19 (*Jensen-Haarup*); Silkeborg, 1 ♂, 6.x.1868 (*O. G. Jensen*); Silkeborg, 1 ♀, 6.viii.22 (*Jensen-Haarup*); no locality, 1 ♂, 15.ix.87 (*O. Jacobsen*); no locality, 1 ♂, no date (*Jensen-Haarup*); Hansted res. Jyll. Kystklitter, 1 ♂, 3 ♀, 3.viii.1963 (*N. P. K.*); Hansted res. Jyll. ø sbl. dal., 1 ♂, 25.viii.1962 (*N. P. K.*); Tebbestrup Bakker, 2 ♀, 16.ix.1910 (*O. Jacobsen*); no locality, 1 ♀, no date (*O. Jacobsen*); Thorsö I., 1 ♀, 4.viii.19, 1 ♀, 18.viii.20 (*Jensen-Haarup*); Vejle, 2 ♀, 9.x.1868 (*O. G. Jensen*); Langå, 1 ♀, 31.v.1891 (*O. Jacobsen*); Sønderborg on Als, 1 ♀, 12.ix.91 (*Wüstnei*). FINLAND: Suomi EH Lammi, 1 ♂, 7.viii.1948 (*R. Linnavuori*); Suomi A M Lamn, 1 ♀, 6.vi.1948 (*R. Linnavuori*); Suomi Perniö, 1 ♀, 22.vi.1948 (*R. Linnavuori*). GERMANY: Hamburg, Börnsen, 1 ♀, 15.vii.32 (*Pillich*); Umg. v Hamburg, Ramelsloh, 2 ♂, 2 ♀, 19.vii.48 (*W. Wagner*). HUNGARY: Isaszeg Sztudva, 1 ♂, 10.vii.1904 (*no collector*). CZECHOSLOVAKIA: Rohatec, Moravia merid., 1 ♀, 9.vii.42 (*Hoffer*). CANADA: Yukon, Dawson, 1 ♀, 10.vi.1949 (*W. W. Judd*); B. C., Soda Creek, 1 ♂, 19.vii.1951, 1 ♂, 21.viii.1951 (*H. R. MacCarthy*), 2 ♂, 2 ♀, 22.vii.1949 (*R. Stace-Smith*); B. C., Tranquilla, 1 ♀, 21.iv.1948 (*C. L. Neilson*); B. C., Vernon, 1 ♀, 16.ix.1931 (*R. D. Bird*); B. C., Creston, 1 ♀, 9.ix.1948 (*D. B. Waddell*); B. C., Summerland, 1 ♀, 26.ix.1932, 1 ♀, 1.v.32 (*A. N. Gartrell*); B. C., Oliver, 2500′, 1 ♀, 2.vii.1953 (*J. R. McGillis*); B. C., Jesmond, 1 ♀, 30.viii.38 (*J. K. Jacob*); B. C., Riske Creek, 1 ♀, 29.vii.1949 (*G. J. Spencer*); B. C., Penticton, 2 ♀, 5.x.1931, 1 ♀, 9.ix.1931 (*R. D. Bird*); B. C., Chimney Cr., 1 ♂, 29.vii.1949 (*G. J. Spencer*); B. C., Willow Pt., 1 ♀, 2.vii.1948 (*D. B. Waddell*); Alta., Stirling, 1 ♂, ix.1926 (*H. L. Seamans*); Alta., Lethbridge, 1 ♂, 22.x.1937 (*G. F. Manson*); Sask., Indian Head, 1 ♂, 20.ix.1929, 1 ♀, 9.vii.1929 (*K. Stewart*); Sask., Saskatoon, 2 ♀, 15.ix. 1924, 1 ♂, 22.iii.1926, 1 ♂, 8.viii.1927, 1 ♂, 17.x.1927, 1 ♂, 7.ix.1927, 1 ♂, 25.v.1928, 1 ♂, 9.vii.1928, 1 ♂, 21.viii.1928, 1 ♂, 9.vii.1929, 1 ♂, 8.viii.192– (*K. M. King*), 13 ♂, 19 ♀, 13.vi.1949, 2 ♂, 2 ♀, 8.vi.1949, 3 ♀, 7.v.1951, 1 ♂, 1 ♀, 15.vii.1949, 2 ♀, 21.vii.1949, 6 ♂, 2 ♀, 17.viii.1949, 1 ♀, 20.vi.1949, 1 ♂, 10.vi.1949, 1 ♂, 2 ♀, 16.viii.1949, 1 ♂, 1 ♀, 25.v.1949 (*L. Konotopetz*), 17 ♀, 10.v.1951, 1 ♂, 8 ♀, 16.viii.1949, 4 ♀, 13.vi.1949, 4 ♂, 3 ♀, 17.viii.1949, 1 ♀, 21.vii.1949 (*A. R. Brooks*); Sask., Plato, 1 ♂, 28.iv.1925, 2 ♀, 28.vii.1925 (*N. J. Atkinson*); Sask., Elbow, 3 ♀, 7.viii.1951 (*A. R. Brooks*); Man., Carberry, 1 ♀, 20.v.1953 (*Brooks & Kelton*); Man., Brandon, 1 ♂, 26.v.50 (*T. V. Cole*). UNITED STATES: Ore., Lapine, 3 ♂, 2 ♀, 2.vii.1935 (*Oman*); Cal., Mono Lake, 2 ♂, 31.vii.40 (*D. E. Hardy*).

New Records: Canada, United States.

The whereabouts of Hardy's type series of *D. variata* from the British Isles (Lobley Hill, Northumberland, and the coast of Berwickshire, Scotland) are unknown and the specimens are presumed lost or destroyed. Walker (1851*b*) lists one specimen in the British Museum Collection from Scotland, presented by J. Hardy, which might have been intended as the type but which unfortunately is no longer present. In the absence of suitable topotypic material, a neotype is not designated.

The holotype ♂ of *D. lenensis* Linnavuori, the only available specimen of this nominal species and located in the Universitetets Zoologiska Museum, Helsinki, was studied.

The holotype of *Notus agnatus* Lethierry was not studied.

Biology. *Dikraneura variata* is a fairly common species found throughout the year. It apparently overwinters in the adult stage (Buckton, 1891*d*; Wagner, 1935*a*, 1941*a*). The earliest emergence records are for February in Germany (Wagner, 1935*a*), March in England (Roche, 1944*a*) and April in the Netherlands (Blöte, 1927*b*). Its latest recorded occurrence is October in Scotland (Hardy, 1850*a*; Marshall, 1867*b*), France (Lambertie, 1901*a*) and Germany (Wagner, 1935*a*) and November at Kiev (Ivanov, 1928*b*). Wagner (1935*a*) also records the presence of nymphs in Germany during July.

The periods of peak emergence are reported as April and July in Germany (Wagner, 1939*a*), March and July in England (Roche, 1944*a*) and April to May and July to September in the Netherlands (Blöte, 1927*b*). In France however it is recorded as common during the end of the summer and autumn (Dominique, 1890*a*; Carpentier & Dubois, 1892*a*; Lambertie, 1901*a*) as is also the case for Scotland (Hardy, 1850*a*; M'Gregor, 1893*a*). Melichar (1896*a*) records it also during July to September in Austria. Lethierry (1874*a*) however found it to be fairly common in France during

May and June. In Germany, Wagner (1935*a*) reports it as occurring from February to October and Kuntze (1937*a*, *b*) also says it is present the whole year.

In N. America, it is again found throughout the year. Specimens at hand indicate its presence during May in British Columbia, Manitoba and Saskatchewan and even as early as April in the former province. It has been found also as late as September in Alberta and Saskatchewan and as late as October in British Columbia.

It is found mainly in grass (Hardy, 1850*a*; Marshall, 1867*b*; Lethierry, 1874*a*; Dominique, 1890*a*; Matsumura, 1906*a*; Blöte, 1927*b*; Wagner, 1935*a*, 1939*a*, 1941*a*; Kuntze, 1937*b*; China, 1943*a*) and low plants (Edwards, 1888*d*; Butler, 1909*a*; Britten, 1919*a*; China, 1943*a*), is a common inhabitant of meadows (Then, 1886*a*; Spitzner, 1892*a*; Melichar, 1896*a*; Fahringer, 1922*a*; Haupt, 1935*a*; Ribaut, 1936*b*; China, 1943*a*) and is often found in grasses in woods (Hardy, 1850*a*; Marshall, 1867*b*; Lethierry, 1874*a*; Ribaut, 1936*b*; China, 1943*a*) and coniferous forests (Wagner, 1939*a*, 1941*a*) especially beneath Scotch Pine (Wagner, 1935*a*; Kuntze, 1937*b*; Rabeler, 1951*a*). Linnavuori (1952*a*) records it in dry *Vaccinium*-pine woods. It has also been taken on grassy heaths (Haupt, 1935*a*; Kuntze, 1937*b*), sandy soil (Haupt, 1935*a*), grassy sand hills (Marshall, 1867*b*) and at the roots of marram grass on sand dunes (Brown, 1937*a*). Fagel (1949*a*) records it in general from the base of plants of dry and sunny ground. In contrast, Dubois (1888*a*) and Carpentier & Dubois (1892*a*) have found it in swamps and marshes whilst Edwards (1885*a*, 1888*d*) and Lambertie (1901*a*) record it also from damp humid places. Specific host plants include *Festuca ovina* L. and *Aira flexuosa* L. in woods (Hardy, 1850*a*), *Onopordon tauricum* Willd. in meadows (Fahringer, 1922*a*), *Geranium robertianum* L. in sea caverns (Hardy, 1850*a*) and *Juncus effusus* L. (Matsumura, 1906*a*).

Remarks. *Dikraneura variata* has been recorded extensively throughout Europe. In 1949, Oman listed it from Pennsylvania in his Check List of Nearctic Leafhoppers but unfortunately gave no corroborative evidence. Beirne (1952*b*, 1956) in a treatment of the leafhoppers of Canada figured it for N. America but failed to recognize its relationship to Hardy's species and recorded it as a variant of the closely related species *D. carneola* (Stål). Linnavuori (1953*a*) described a form from Siberia which, although acknowledged to be closely related to *D. variata*, was considered to be a new species, *D. lenensis*. Vilbaste (1965) has also described a form from the Altay region of Russia similar to that of *D. lenensis* but which he tentatively considered, together with *D. lenensis*, as *D. carneola*. In the present study, an examination of material from the British Isles, Europe and N. America, together with the holotype of *D. lenensis*, shows that Hardy's species is more widespread than previously thought and extends from Europe eastwards into the northwest coastal area of N. America.

A noticeable feature of *D. variata* is the variability in the apical region of the aedeagus throughout its geographical range. The form typical of the British Isles, as well as a number of specimens from the European continent, is shown in Text-fig. 11. In general, the continental forms show a more gradual tapering at the apex of the shaft (seen also in some specimens from the British Isles), the apical processes more slender and a slight increase in the length of the subapical processes (Text-figs.

17, 18 and 19). This variability is very marked in the Nearctic region (Text-figs. 20–29) even within the same population (Text-figs. 26, 27 and 29) yet certain forms show a strong resemblance to those from Europe (cf. Text-fig. 17 with 20 and 19 with 28). The form described from Siberia as *D. lenensis* Linnavuori as well as that described by Vilbaste (1965) is seen to fit within this variability range and suggests the presence of *D. variata* throughout the Palaearctic region, a fact which only further collecting in this area can verify.

In addition to the above variation, there is a noticeable increase in body length between Europe and N. America. This varies in the males from 2·92–3·24 mm. (mean 3·04 mm.) in the British Isles, 3·12–3·36 mm. (mean 3·24 mm.) in Europe and 3·34–3·64 mm. (mean 3·44 mm.) in N. America. The females, which are slightly larger in general than the males, show a similar increase. The body is also more slender in the Nearctic forms and the head more variable in the acuteness of its apex, ranging from that seen in the European forms (Text-fig. 1) to that of *D. carneola* (Stål) (Text-figs. 30 and 31). The Nearctic forms are also much paler in general than the European forms with the disc of the pronotum and basal half of the fore wings often pale pink.

D. variata is very closely related to the N. American species *D. carneola* (Stål) particularly in the shape of the aedeagus. That of *D. carneola* however is relatively smaller and much narrower and more elongate apically in lateral aspect with the apical processes directed more dorsad. Like *D. variata*, *D. carneola* shows a certain, though less well marked, variability in the shape of the aedeagus (Text-figs. 46–58). A comparison of these figures with those of *D. variata* however shows the range to be distinct in both species without visible evidence of overlap. In addition, *D. variata* is distinguished by its slightly larger and more elongate pygofer, the presence of microspines over the posterior region of the lateral wall of the latter and by its larger and more posteriorly directed abdominal apodemes. Externally, the European forms of *D. variata* are readily distinguishable from *D. carneola* by their shorter and more robust shape and their more sordid coloration. The Nearctic forms of *D. variata* however are more difficult to distinguish externally from *D. carneola*, although in general *D. variata* is much paler in colour with the ventral surface of the female pygofer cream rather than dark brown. The vertex is also more obtusely angled anteriorly in *D. variata*. They occur sympatrically over the north-west region of N. America and have been taken together at Lapine, Oregon, and Mono Lake, California, thereby indicating their status as distinct species rather than subspecies. Further collecting is undoubtedly required in this area, as well as throughout Siberia, in order to determine more conclusively the relationship of these two species.

Dikraneura carneola (Stål)

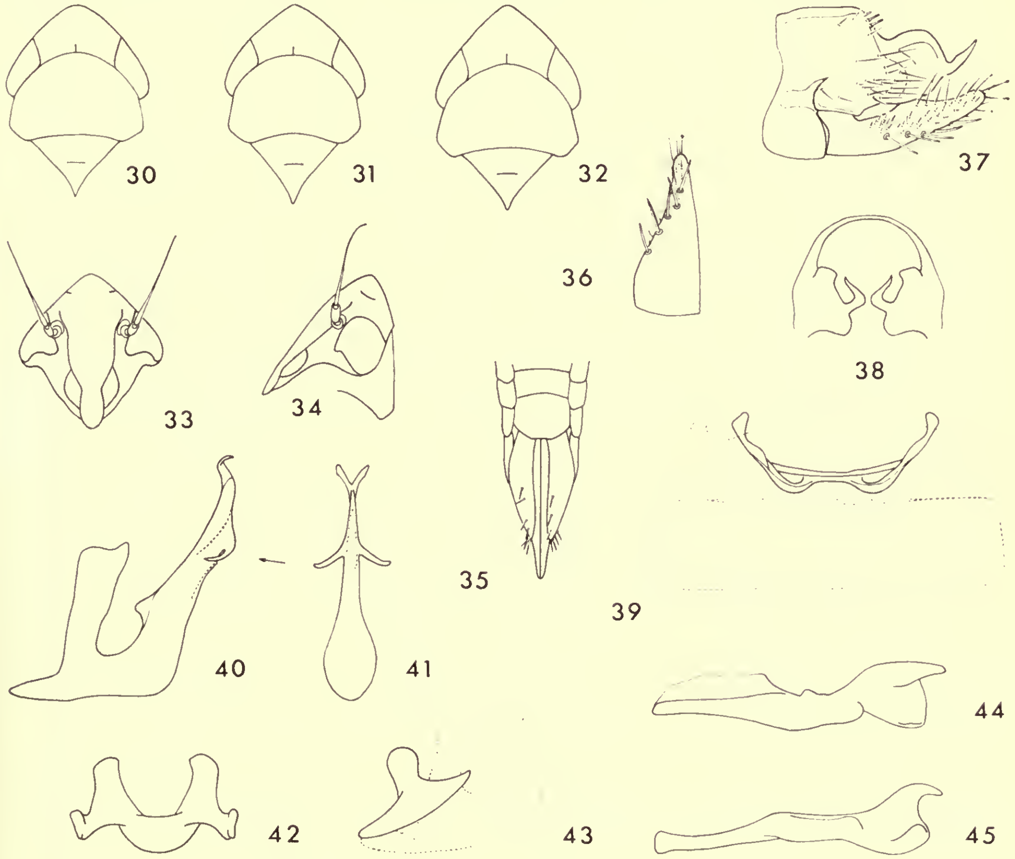
(Text-figs. 30–58)

Typhlocyba carneola Stål, 1858*e* : 196.
Dikraneura carneola var. *sitkana* Ball & DeLong, 1925*a* : 330.

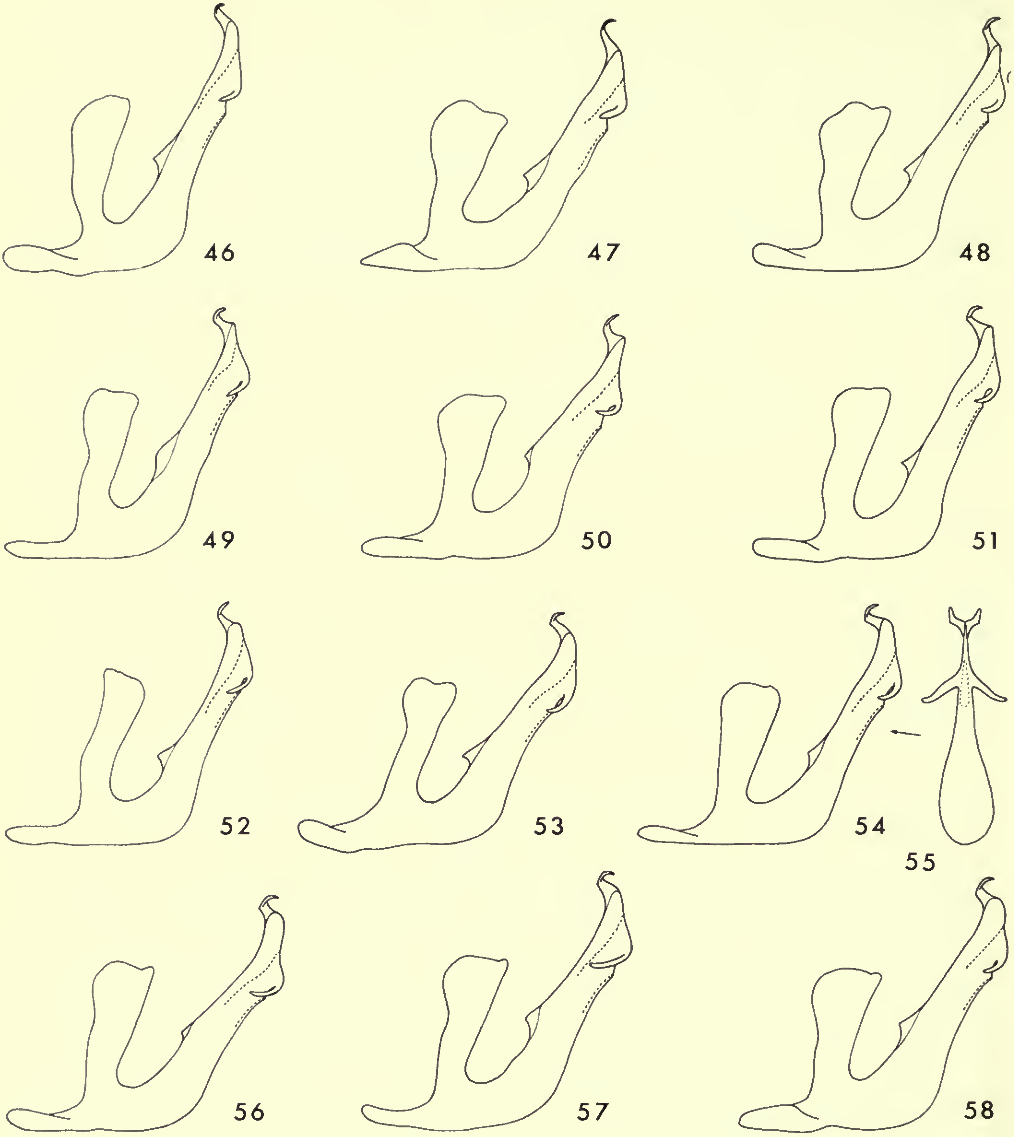
Length: ♂ 3·32–3·90 mm. (mean 3·63 mm.). ♀ 3·62–4·24 mm. (mean 3·88 mm.).

Head with width equal to or slightly greater than pronotum, vertex angularly produced with apex narrowly or broadly rounded in dorsal aspect, with medial length $1\frac{1}{2}$–$1\frac{3}{4}$ times length next eyes, narrowly rounded to face with latter approximately as long as wide, with ocellocular area equal in width to antennal fossa; pronotum with width increasing only slightly posteriorly.

Colour of face sordid cream or pale brownish with anteclypeus yellowish and genae cream; vertex usually paler than face, often cream, usually washed with yellow, rarely orange, sometimes with a small patch on either side of midline just behind apex orange or yellow, with narrow medial longitudinal stripe cream, sometimes obscure; sutures on anterior margin usually orange with marginal area between cream, a small oval patch immediately above base of antenna whitish, sometimes obscure; eyes testaceous. Pronotum with disc sordid cream or light brownish, sometimes pinkish, rarely red, anterior and lateral margins yellow marked irregularly with cream, rarely uniformly sordid cream; scutellum yellow, sometimes marked



Figs. 30–45. *Dikraneura carneola* (Stål). 30, head, pronotum and scutellum, dorsal view; 31, same; 32, same; 33, face; 34, head and pronotum, left lateral view; 35, female genitalia, ventral view; 36, left subgenital plate, ventral view; 37, male pygofer, valve and subgenital plates, left lateral view; 38, pygofer, posterior view; 39, abdominal apodemes, dorsal view; 40, aedeagus (Mammoth Lake, California), left lateral view; 41, aedeagus, posterior view in direction of arrow in previous fig.; 42, connective, antero-dorsal view; 43, connective, left lateral view; 44, left style, dorsal view; 45, left style, left lateral view. Scale as in figs. 1–16.



Figs. 46–58. *Dikraneura carneola* (Stål). 46, aedeagus (Weed, Siskiyou Co., California), left lateral view; 47, same (Baja California, Mexico); 48, same (Mammoth Lake, California); 49, same (Mammoth Lake, California); 50, same (Yosemite Valley, California); 51, same (Yosemite National Park, California); 52, same (Mammoth Lake, California); 53, same (Mammoth Lake, California); 54, same (Mammoth Lake, California); 55, aedeagus, posterior view in direction of arrow in previous fig.; 56, aedeagus (Yosemite National Park, California), left lateral view; 57, same (Mammoth Lake, California); 58, same (Yosemite National Park, California). Scale as in figs. 11–16.

irregularly with cream, rarely uniformly sordid cream; remainder of thorax dark brown, touched laterally with yellow. Legs pale stramineous. Fore wings with basal area subhyaline greenish yellow or light brownish, sometimes pinkish, rarely red, often pale; apical half hyaline with veins greenish yellow or cream, pinkish when base so coloured, sometimes pale smoky brown over apical cells. Hind wings hyaline with veins dark brown. Abdomen with dorsum and venter dark brown to black, former with lateral edge of posterior segments sometimes yellow, sternites with lateral and posterior borders sometimes yellow or whitish yellow; male pygofer and anal tube dark brown to black, valve dark brown, subgenital plates light brown, rarely whitish, yellowish or orange; female pygofer dark brown with narrow ventral edge bordering ovipositor cream, ovipositor cream with apex beyond pygofer dark brown, sternum VII cream with anterolateral angles dark brown.

Male apodemes short, decreasing gradually in length laterally, spoon-shaped, directed dorso-posteriorly, rarely posteriorly.

Male genitalia with pygofer as in *D. variata* Hardy but relatively shorter and more robust, with microspines absent or only weakly developed over small area. Aedeagus with preatrium and dorsally directed basal apodeme well developed; shaft directed dorsally, laterally compressed and tapering towards apex, terminating apically in a pair of short, narrow, dorsolaterally directed processes, their apices turned posteriorly, a pair of subapical processes on posterior margin directed anterolaterally, a pair of short triangular processes on anterior margin near base; gonopore elongate, on posterior margin between bases of posterior processes.

Female genitalia with sternum VII as in *D. variata* Hardy.

Distribution. Alaska (Stål, 1858*e*; Ashmead, 1904*a*), British Columbia (Gillette, 1898*a*; Ball & DeLong, 1925*a*; Downes, 1927*a*; Beirne, 1952*b*), Alberta (Strickland, 1953*a*), Ontario (Gibson, 1913*a*; Ball & DeLong, 1925*a*), Maine (Osborn, 1915*a*), South Dakota (Ball & DeLong, 1925*a*), Minnesota (Ball & DeLong, 1925*a*), Washington (Gillette, 1898*a*; Hatch, 1938*a*; Wolfe, 1955*c*), Oregon (Van Duzee, 1917*a*; McAtee, 1924*a*; Ball & DeLong, 1925*a*; Beirne, 1952*b*), Idaho (Ball & DeLong, 1925*a*; Knowlton & Allen, 1936*a*; Fox, 1938*a*; Barber, 1943*a*), California (Van Duzee, 1914*a*, 1916*b*, 1917*a*; Johnson & Ledig, 1918*a*; Ball & DeLong, 1925*a*; Beirne, 1952*b*), Utah (McAtee, 1924*a*; Ball & DeLong, 1925*a*; Knowlton, 1929*b*, 1931*b*; Knowlton & Allen, 1936*a*; Hayward, 1948*a*, 1952*a*; Knowlton, 1949*a*; Beirne, 1952*b*; Kaloostian, 1952*a*; Knowlton, 1953*b*), Colorado (Ball & DeLong, 1925*a*; Beirne, 1952*b*), Arizona (Gillette, 1898*a*; McAtee, 1924*a*; Ball & DeLong, 1925*a*), New Mexico (Ball & DeLong, 1925*a*), Mexico (Ball & DeLong, 1925*a*).

Specimens seen. CANADA: B. C., Grand Forks, 2 ♀, 14.v.1948 (*R. H. Handford*); B. C., Okanagan Falls, 2,500′, 1 ♂, 2 ♀, 16.vi.1953 (*J. R. McGillis*); B. C., Oliver, 1 ♂, 2 ♀, 18.vi.1953 (*J. R. McGillis*); B. C., Creston, 1 ♂, 9.ix.1948 (*D. B. Waddell*); Alta., Edmonton, 1 ♀, 15.vi.1937 (*F. O. Morrison*). UNITED STATES: Wash., Colokum Pass, 13 ♂, 3 ♀, 21.vii.1949 (*R. H. Beamer*); Wash., S. of Cheney, 6 ♂, 10 ♀, 9.vii.1935 (*Oman*); Wash., Mt. Ranier, Hells Crosng., 5 ♂, 14 ♀, 7.vii.1935 (*Oman*); Wash., Mt. Ranier, Cottnwd Flts., 2 ♀, 7.vii.1935 (*Oman*); Wash., Ritzville, 11 ♂, 13 ♀, 8.vii.1935 (*Oman*); Wash., Liberty, 4 ♂, 27.vii.1949 (*R. H. Beamer*); Wash., American River, 1 ♂, 29.vii.1949 (*R. H. Beamer*); Wash., S. of Spokane, 4 ♀, 9.vii.1935 (*Oman*); Wash., Palouse, Kamiak Butte, 5 ♀, 1.x.1918 (*A. C. Burrill*); Wash., Sprague, 1 ♂, 1 ♀, 20.vii.1949 (*R. H. Beamer*); Wash., Prosser, 1 ♂, 3 ♀, 8.vii.1935 (*Oman*); Wash., Cliffdell, 1 ♂, 7.vii.1935 (*Oman*); Ida., Coeur d'Alene, 3 ♂, 3 ♀, 9.vii.1935 (*Oman*); Ida., Butte Co., 2 miles N.E. Moore, 1 ♂, 10.ix.1957 (*G. W. Bishop*); Ida., Cataldo, 1 ♀, 9.vii.1935 (*Oman*); Ida., Moscow Mt., 1 ♂, 4.vi.1936 (*C. B. Philip*); Mont., Hamilton, 12 ♂, 19.vii.1949 (*R. H. Beamer*); Mont., 30 miles S. Darby, 1 ♂, 17.vii.1949 (*B. T. McDermott*); Mont., E. of Butte, 1 ♀, 11.vii.1935 (*Oman*); Ore., Mt. Hood, 30 ♂, 47 ♀, 3.vii.1935 (*Oman*); Ore., Criterion Pass, 5 ♂, 3 ♀, 2.vii.1935 (*Oman*); Ore., N. of Bend, 1 ♂, 1 ♀, 2.vii.1935 (*Oman*); Ore., S. of Bend, 1 ♀, 2.vii.1935 (*Oman*); Ore., Bend, 4 ♂, 6 ♀, 2.vii.1935 (*Oman*); Ore., Lapine, 4 ♂, 7 ♀, 2.vii.1935 (*Oman*); Ore., Klamath Ag., 1 ♂, 6 ♀, 1.vii.1935 (*Oman*); Ore., Crater Lake Natl. Park, El. 6,500′, 2 ♂, 5 ♀, 23.vii.1949 (*E. L. Atkinson*); Ore., Klamath Co., Algoma, El. 4,100′, 7 ♂, 3 ♀, 22.vii.1949 (*E. L. Atkinson*); Ore., Pendleton, 2 ♂, 14.vii.31 (*M. W. Sanderson*); Ore., Bonneville, 1 ♀, 4.vii.1935 (*Oman*); Ore., Meacham, 1 ♂, 14.vii.31 (*R. H. Beamer*); Ore., Haines, 2 ♂, 10.vii.31 (*R. H. Beamer*); Ore., Anthony Lake, 1 ♂, 11.vii.31 (*J. Nottingham*); Ore., Cove, 1 ♂, 8.viii.1927 (*H. E. Wallace*); Ore., Astoria, 1 ♀, ix.22 (*no collector*); Ore., S. of Worden, 1 ♀, 1.vii.1935 (*Oman*); Ore., Sun Pass, 1 ♂, 1.vii.35 (*R. H. Beamer*); Cal., Alpine Co., Carson Pass, 4 ♂, 4 ♀, 29.vi.57 (*J. Powell*); Cal., Inyo Co., Mono Pass, 2 ♂, 13.viii.57 (*J. Powell*); Cal., Tuolumne Co., Chipmunk Flat, 3 ♂, 4 ♀, 13.vi.62 (*J. Powell*); Cal., Tioga Pass, 3 ♂, 7 ♀, 31.vii.1940 (*L. J. Lipovsky*), 1 ♂, 31.vii.40 (*D. E. Hardy*); Cal., Ventura Co., Mt. Pinos, 7,500′, 1 ♂, 2 ♀, 8.v.59 (*G. I. Stage*), 1 ♂, 8.v.59 (*C. W. O'Brien*); Cal., Modoc Co., Cedar Pass, 3 ♂, 3 ♀, 29.vi.55 (*J. W. MacSwain*); Cal., Sequoia Nat. Pk., 5 ♂, 4 ♀, 6.viii.40 (*D. E. Hardy*); Cal., Bishop, 3 ♂, 1 ♀, 28.vii.40 (*L. J. Lipovsky*), 1 ♀, 28.vii.40 (*D. E. Hardy*); Cal., San Jacinto Mts., Idyllwild, 1 ♂, 1 ♀, 22.v.1940 (*C. D. Michener*); Cal., Siskiyou Co., 24 miles N. Weed, 1 ♂, 24.vii.1949, 7 ♂, 6 ♀, 23.vii.1949 (*E. L. Atkinson*); Cal., Siskiyou Co., 12 miles S. Dorris, 1 ♂, 23.vii.1949 (*E. L. Atkinson*); Cal., San Jacinto Mts., 2 ♂, 1 ♀, 20.vii.41, 1 ♂, 21.vii.29, 1 ♂, 30.vi.33 (*R. H. Beamer*); Cal., San Jacinto Mts., Tahquitz Valley, 1 ♀, 3.vi.1940 (*C. D. Michener*); Cal., San Jacinto Mts., Pinon Flat, 1 ♂, 21.v.1940 (*C. D. Michener*); Cal., Shasta Co., Kings Crk Mdw., 1 ♀, 2.vii.1947 (*C. A. Hanson*); Cal., Yucaipa, 3 ♂, 8.iv.39 (*Christensen*); Cal., San Gabriel, 1 ♀, 7.vii.26 (*no collector*); Cal., Giant Forest, 5 ♂, 28.vii.29 (*R. H. Beamer*); Cal., Lone Pine, 1 ♀, 28.vii.1940 (*D. E. Hardy*); Cal., Eldorado Co., Pyramid R. S., 1 ♂, 12.vii.48 (*S. A. Sher*); Cal., Little Lake, 1 ♂, 25.vii.1940 (*D. E. Hardy*); Cal., Mariposa Co., Miama Ranger Sta., 1 ♀, 22.vi.1942 (*A. J. Walz*); Cal., Big Bear Lake, 1 ♂, 26.vii.32 (*R. H. Beamer*); Cal., Davis, 1 ♂, 19.iii.1958 (*E. Jessen*); Cal., 3 miles S.E. Mt. Lassen, 2 ♂, 3 ♀, 8.vii.55 (*J. W. MacSwain*); Cal., Tulare Co., Wood L., 1 ♀, 22.iii.1947 (*N. W. Frazier*); Cal., Tahoe, G. Alpine Cr., 1 ♂, 23.vi.15, 1 ♀, 3.x.15 (*E. P. Van Duzee*); Cal., Tahoe, Angora L., 1 ♀, 22.vi.15 (*E. P. Van Duzee*); Cal., Tahoe, Grass Lake, 1 ♀, 24.vi.15 (*E. P. Van Duzee*); Cal., 2 miles E. of Ineber Lake, 1 ♂, no date (*no collector*); Cal., Madera Co., Jackass Meadow, 1 ♂, 31.vii.1946 (*T. O. Thatcher*); Cal., Glenn Co., Plaskett Mdws., 6,200′, 1 ♂, 2 ♀, 3.vii.60 (*J. Powell*); Cal., Guatay, 1 ♂, 21.vii.41 (*E. L. Todd*); Cal., Echo, 9 ♂, 8 ♀, 10.viii.1940 (*L. J. Lipovsky*); Cal., Mammoth Lake, 20 ♂, 13 ♀, 29.vii.1940 (*D. E. Hardy*), 3 ♂, 2 ♀, 29.vii.1940 (*L. J. Lipovsky*), 1 ♂, 29.vii.40 (*R. H. Beamer*); Cal., Mono Lake, 2 ♂, 31.vii.40 (*D. E. Hardy*); Cal., Mono Co., Sonora Pass, McKay Creek, 2 ♀, 18.viii.60 (*E. Jessen*); Cal., Yosemite Nat. Pk., 21 ♂, 22 ♀, 1.viii.1940 (*L. J. Lipovsky*), 10 ♂, 14 ♀, 1.viii.1940 (*D. E. Hardy*), 2 ♂, 1.viii.40 (*L. C. Kuitert*), 1 ♂, 1.viii.40 (*R. H.

Beamer); Cal., Yosemite Valley, 1 ♂, 10.vii.33 (*R. H. Beamer*); Cal., Yosemite, 3,880′–4,000′, 1 ♂, 19.v.1938 (*N. F. Hardman*); Utah, Provo Canyon, 4 ♂, 3 ♀, 15.viii.40 (*D. E. Hardy*); Utah, Provo, 1 ♂, xi.192– (*D. Elden Beck*); Utah, Smithfield, 1 ♀, 13.vii.1935 (*Oman*); Utah, Strwbry Dam, 13 ♀, 16.vii.1935 (*Oman*); Utah, Farmington, 2 ♂, 1 ♀, 10.x.1953 (*G. F. Knowlton*); Utah, Cotton, 1 ♂, 4 ♀, 22.vi.43 (*S. F. Knowlton*); Utah, Wanship, 2 ♂, 2 ♀, 28.vi.43 (*S. F. Knowlton*); Utah Exp. St., 1 ♂, no date (*G. F. Knowlton*); Utah, Park City, 1 ♂, 1.viii.1947 (*R. H. Beamer*); Utah, Fish Lake, 1 ♂, 16.viii.29 (*R. H. Beamer*), 1 ♀, 2.ix.30 (*no collector*); Utah, Heber, 1 ♂, 17.viii.40 (*R. H. Beamer*); Utah, Midvale, 1 ♂, 1 ♀, 10.x.1953 (*G. F. Knowlton*); Utah, Naples, 1 ♂, 28.vi.43 (*G. F. Knowlton*); Utah, Willow Creek, 1 ♀, 27.vi.43 (*S. F. Knowlton*); Colo., Craig, 1 ♂, 3.viii.1947 (*R. H. Beamer*); Nev., Ormsby Co., 1 ♀, vii (*Baker*); Nev., Carson City, 1 ♂, 9.viii.29 (*R. H. Beamer*). MEXICO: Baja Calif., Sierra San Pedro Martir, 2 miles W. La Sanja, 6,500′, 2 ♂, 2.vi.58 (*J. Powell*); Baja Calif., Sierra San Pedro Martir, 3 miles S. Encinas, 1 ♂, 1 ♀, 3.vi.58 (*J. Powell*); Baja Calif., Sierra San Pedro Martir, 4 miles S. Encinas, 6,000′, 1 ♀, 2.vi.58 (*J. Powell*); Baja Calif., Sierra San Pedro Martir, 5 miles N.E. Encantada, 9,000′, 11 ♂, 8 ♀, 31.v.58 (*J. Powell*); Baja Calif., Sierra San Pedro Martir, La Grulla, 6,500′, 19 ♂, 3 ♀, 28.v.58, 7 ♂, 16 ♀, 29.v.58, 1 ♀, 1.vi.58 (*J. Powell*).

New Records: Montana, Nevada.

Dikraneura carneola was originally described by Stål from Sitka, Alaska. Unfortunately, this was restricted to only colour and wing venation which alone are insufficient to characterize the species concerned. Beirne (1952*b*) draws attention to this fact and queries whether the *carneola* of American authors is in fact the *carneola* of Stål. The male holotype, stated by Stål (1958*e*) to be in his personal collection, could not be located in the latter in the Naturhistoriska Riksmuseum in Stockholm.[1] Attempts to locate it in the Naturhistorisches Museum, Vienna, were likewise without success.[2] Unfortunately, the species *D. absenta* DeLong & Caldwell, *D. variata* Hardy, *D. ossia* Beirne, *D. mali* (Provancher) and *D. shoshone* Delong & Caldwell, as well as *carneola*, all extend over the northwestern region of N. America and fit the original description so that any one of these species might conceivably have been taken by Stål. However, in order to avoid unnecessary nomenclatorial confusion, it was decided to follow the *carneola* of authors. The absence of suitable topotypic material prevents the designation of a neotype.

One male and one female of *Dikraneura carneola* var. *sitkana* labelled " Logan, Utah, 6–20–08 " " Paratype " together with 1 ♂ labelled " Salt Lake, Utah, 6–16–98 " were also studied. All three specimens are located in the U.S.N.M.

Biology. *Dikraneura carneola* is a very common species present from early spring to late summer throughout its range. Its earliest recorded occurrence is April in California (Van Duzee, 1914*a*) although specimens at hand show it to be active in this state as early as March. Its latest recorded occurrence is October in Utah (McAtee, 1924*a*; Knowlton, 1931*b*, 1953*b*), this month being indicated also in specimens at hand from Washington, California and Utah while November is seen to be the latest for the latter state. It occurs on grasses (Osborn, 1915*a*; Van Duzee, 1916*b*; Ball & DeLong, 1925*a*; Downes, 1927*a*; Hayward, 1952*a*; Wolfe, 1955*c*), oats (Osborn, 1915*a*; Wolfe, 1955*c*), wheat (Osborn, 1915*a*; Wolfe, 1955*c*; Knowlton, 1949*a*), weeds (Fox, 1938*a*; Wolfe, 1955*c*), alfalfa (Hatch, 1938*a*; Wolfe, 1955*c*; Knowlton, 1953*b*), beets (Knowlton & Allen, 1936*a*), potato (Knowlton & Allen, 1936*a*; Wolfe, 1955*c*), clover (Wolfe, 1955*c*), sweet corn (Barber, 1943*a*) and matrimony vine (Knowlton & Allen, 1936*a*). Its specific host plants include *Gutierrezia* sp. (Knowlton, 1931*b*), *Chrysothamnus* sp., *Atriplex rosea* L., *Sophia sophia* (L.) and *Salsola pestifer* Nelson (Knowlton & Allen, 1936*a*). Wolfe (1955*c*) grades the host plants according to their importance, with *Medicago sativa* L. (alfalfa), *Prunus avium* L. (sweet cherry), *Prunus persica* Batsch (peach), *Solanum tuberosum* L. (potato) and various species of weeds as accidental associations only, *Avena sativa* L. (oats), *Hordeum* sp. (barley), *Secale cereale* L. (rye), *Triticum aestivum* L. (wheat) as food plants and with various species of grasses providing the only hosts for oviposition and nymphal development. *D. carneola* is considered as a common meadow form (Ball & DeLong, 1925*a*), abundant in wet swampy meadows (Van Duzee, 1916*b*; Hayward, 1952*a*). Kaloostian (1952*a*) records it in moderate numbers in stone fruit orchards in Utah and Hayward (1948*a*) in his study of the Wasatch Chaparral community in Utah records it in the herb-low shrub layer at 5,200′–6,800′. Glick (1939*a*), in his study of the distribution of insects in the air, collected it at 2,000′ at night. Wolfe (1955*c*) considers it as one of the most important species in Washington, causing damage to alfalfa, clover, grains and grasses as well as infesting lawns. It is also considered an injurious species on grasses, oats and wheat in Maine (Osborn, 1915*a*). It has been found injuring the leaves of sweet corn in Idaho (Barber, 1943*a*) as well as producing tiny-spot leaf discoloration injury to alfalfa in Utah (Knowlton, 1953*b*). Kaloostian (1952*a*) reports it as responsible, with other species, for the transmission of the Western X-disease virus of stone fruits in Utah.

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[1] Dr. E. Kjellander, in correspondence.

[2] Dr. M. Beier, in correspondence.

Remarks. *Dikraneura carneola* shows a certain variability in the shape of the aedeagus (Text-figs. 40 and 46–58) even among individuals from the same locality (cf. Text-figs. 40, 48, 49, 52, 53, 54 and 57, from Mammoth Lakes, California, and Text-figs. 51, 56 and 58 from the Yosemite National Park, California). The most common forms are those shown in Text-figs. 40, 46, 48, 51, 53 and 54. This species is very closely related to *D. variata* Hardy and is further discussed under the latter species.

Dikraneura absenta DeLong & Caldwell

(Text-figs. 59–74)

Dikraneura (*Notus*) *absenta* DeLong & Caldwell, 1937*a* : 28.
Dikraneura (*Notus*) *termina* DeLong & Caldwell, 1937*a* : 29. **syn. n.**
Dikraneura feirde Beirne, 1952*b* : 252. **syn. n.**

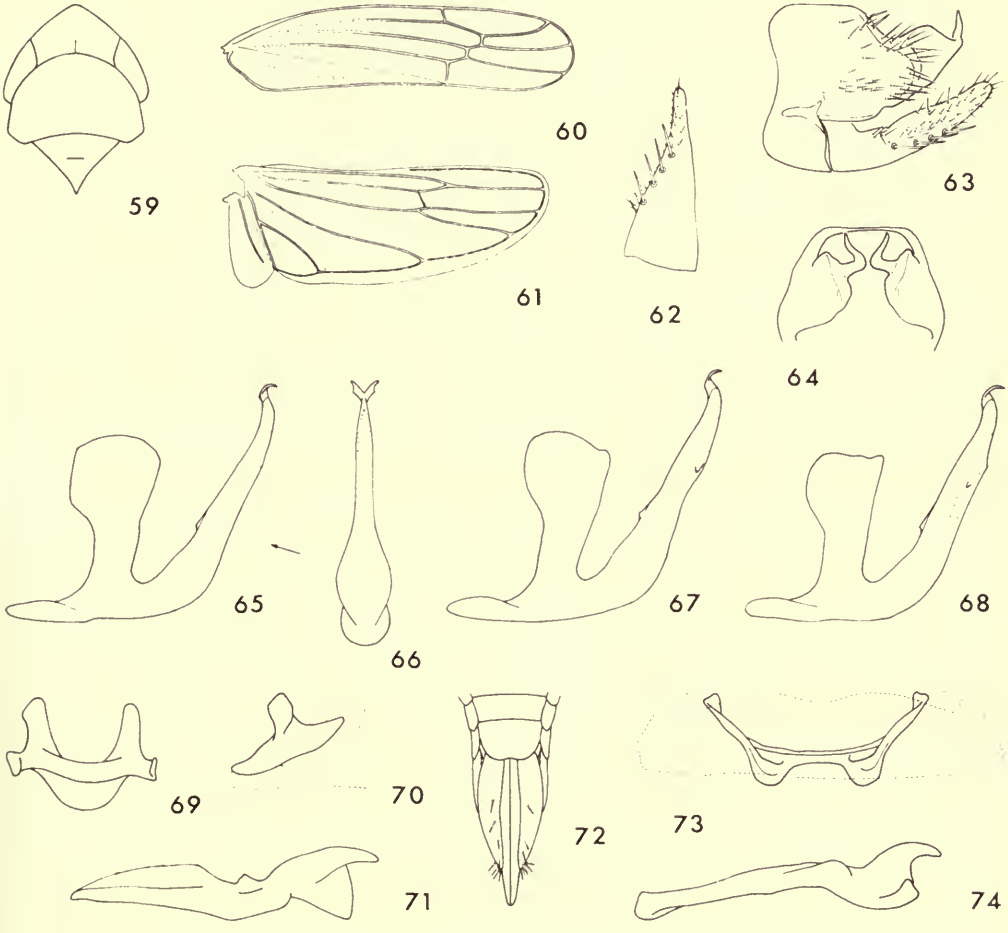
Length: ♂ 3·38–3·92 mm. (mean 3·63 mm.). ♀ 3·40–4·10 mm. (mean 3·78 mm.).

Form and colour as in *D. carneola* (Stål) but with vertex usually more broadly rounded in profile and dorsal aspect, with head more yellowish, small creamish patch above antenna and that between marginal sutures less distinct, the midline of the pronotum often paler and with ventral surface of abdomen and female pygofer pale yellow or cream.

Male apodemes short, poorly developed, directed dorsoposteriorly, not spoon-shaped.

Male genitalia with pygofer as in *D. variata* Hardy but with pygofer relatively shorter and more robust and with microspines absent or only weakly developed over small area. Aedeagus as in *D. carneola* (Stål) but without subapical processes on posterior margin, with apical processes relatively shorter and with triangular processes on anterior margin very small.

Female genitalia with sternum VII as in *D. variata* Hardy.



Figs. 59–74. *Dikraneura absenta* DeLong & Caldwell. 59, head, pronotum and scutellum, dorsal view; 60, fore wing; 61, hind wing; 62, left subgenital plate, ventral view; 63, male pygofer, valve and subgenital plate, left lateral view; 64, male pygofer, posterior view; 65, aedeagus, left lateral view; 66, aedeagus, posterior view in direction of arrow in fig. 65; 67, aedeagus, left lateral view; 68, same; 69, connective, anterodorsal view; 70, connective, left lateral view; 71, left style, dorsal view; 72, female genitalia, ventral view; 73, abdominal apodemes, dorsal view; 74, left style, left lateral view. Scale as in figs. 1–16.

Distribution. British Columbia (DeLong & Caldwell, 1937*a*; Beirne, 1952*b*), Washington (DeLong & Caldwell, 1937*a*; Wolfe, 1955*c*), Oregon, Idaho, Utah, Colorado, California and Arizona (DeLong & Caldwell, 1937*a*).

Specimens seen. CANADA: B. C., Summerland, 1 ♀, 18.vi.31, 1 ♂, 2 ♀, 10.ix.31 (*A. N. Gartrell*), 2 ♀, 11.vii.50 (*B. P. Beirne*); B. C., Kool Bay, 1 ♂, 21.ix.1948 (*D. B. Waddell*); B. C., Abbotsford, 1 ♀, 6.ix.50 (*no collector*); B. C., MacGillivray Creek Game Reserve, nr. Chilliwack, 1 ♂, 14.vii.1953 (*G. J. Spencer*); B. C., Creston, 2 ♂, 1 ♀, 9.ix.1948 (*D. B. Waddell*); B. C., Shuswap Lake, 1 ♀, 22.vii.1926 (*J. McDunnough*); B. C., Goldstream, 1 ♂, 7.vii.50 (*B. P. Beirne*); B. C., Willow Pt., 1 ♂, 1 ♀, 2.vii.1948 (*D. B. Waddell*). UNITED STATES: Wash., Kalama, 7 ♂, 12 ♀, 4.vii.1935 (*Oman*); Wash., Puyallup, 4 ♂, 14 ♀, 6.vii.1935, 2 ♂, 9 ♀, 5.vii.1935 (*Oman*); Wash., Mt. Ranier, Cottnwd Flts., 2 ♂, 4 ♀, 7.vii.1935 (*Oman*); Wash., Mt. Ranier, Hells Crosng., 2 ♀, 7.vii.1935 (*Oman*); Wash., Ft. Lewis, 1 ♂, 5.vii.1935 (*Oman*); Wash., Buckley, 1 ♂, 4 ♀, 6.vii.1935 (*Oman*); Wash., Randle, 2 ♂, 1 ♀, 22.vii.1949 (*J. R. White*); Wash., Ritzville, 1 ♀, 8.vii.1935 (*Oman*); Wash., Sprague, 1 ♂, 20.vii.1949 (*R. H. Beamer*); Ore., S. of Worden, 16 ♂, 14 ♀, 1.vii.1935 (*Oman*); Ore., Bonneville, 5 ♂, 16 ♀, 4.vii.1935 (*Oman*); Ore., Bend, 3 ♂, 2.vii.1935 (*Oman*); Ore., S. of Bend, 1 ♀, 2.vii.1935 (*Oman*); Ore., Klamath Co., Algoma, El. 4,100′, 1 ♂, 2 ♀, 22.vii.1949 (*E. L. Atkinson*); Ore., Klamath Falls, 1 ♀, 1.vii.1935 (*Oman*); Ore., Yoncalla, 1 ♂, 12.vii.35 (*R. H. Beamer*); Ida., Butte, 1 ♂, 26.viii.38 (*no collector*); Ida., Cataldo, 2 ♂, 1 ♀, 9.vii.1935 (*Oman*); Ida., Coeur d'Alene, 3 ♂, 8 ♀, 9.vii.1935 (*Oman*); Mont., W. of Manhatn., 2 ♂, 1 ♀, 11.vii.1935 (*Oman*); Cal., Siskiyou Co., Gazelle, 1 ♀, 24.vi.58 (*J. Powell*); Cal., Mt. St. Helena, Hanleys, 1 ♀, 3.v.1947 (*T. O. Thatcher*); Cal., Modesto, 1 ♀, 29.v.1939, 1 ♀, 19.v.1942, 2 ♂, 2 ♀, 14.vi.1942 (*no collector*); Cal., Taft, 2 ♀, 19.v.1942, 1 ♂, 20.vi.1942 (*no collector*); Cal., Onyx, 1 ♀, 23.vii.40 (*R. H. Beamer*); Cal., Campo, 3 ♀, 18.vii.40 (*D. E. Hardy*); Cal., Sequoia Nat. Pk., 2 ♂, 6.viii.1940 (*D. E. Hardy*); Cal., Inyo Co., Owens Valley, 1 ♀, 19.v.1937 (*no collector*); Cal., Modoc Co., 7 miles S.E. Tule Lake, 1 ♀, no date (*R. F. Smith*); Cal., La Jolla, 1 ♂, 6 ♀, 14.vii.41 (*R. H. Beamer*); Cal., Contra Costa Co., Antioch, 2 ♀, 6.iv.56 (*M. Wasbauer*); Cal., Berkeley, 1 ♂, 1 ♀, x.1914, 2 ♀, ix.1914 (*E. P. Van Duzee*); Cal., Davis, 1 ♀, 17.vii.1936, 1 ♀, vii.1937 (*no collector*); Nev., Austin, 1 ♂, 12.viii.1940 (*D. E. Hardy*); Utah, Wanship, 1 ♂, 28.vi.43 (*S. F. Knowlton*); Ariz., White Mts., 16 ♂, 19.vi.1950 (*R. H. Beamer*); Ariz., Granite Dells, 23 ♂, 3 ♀, 3.vii.1950 (*R. H. Beamer*); Ariz., Oak Creek Cn., 1 ♀, 26.vi.1950 (*R. H. Beamer*); Ariz., Santa Rita Mts., 2 ♂, 10.vii.1950 (*R. H. Beamer*); N. M., Mountain Park, 1 ♂, 2 ♀, 27.vi.40 (*D. E. Hardy*).

New Records: Montana, Nevada, New Mexico. A single specimen from the Canal Zone is present in the Osborn Collection, Ohio State University.

The holotype ♂ (UNITED STATES: Ida., Craters of Moon, 29.vi.30 (*no collector*)), allotype ♀ (UNITED STATES: Wash., Kalama R., 21.vii.31 (*R. H. Beamer*)) and 10 paratypes (CANADA: B. C., Kelowna, 1 ♂, 1 ♀, 5.viii.31 (*R. H. Beamer*); B. C., Merritt, 1 ♀, 3.viii.31 (*J. Nottingham*); B. C., Merritt, 1 ♀, 3.viii.31 (*R. H. Beamer*). UNITED STATES: Cal., Donner Lake, 1 ♂, 6.viii.30 (*no collector*); Cal., Strawberry, 1 ♂, 8.viii.29 (*R. H. Beamer*); Ariz., Oak Creek Cn., 1 ♂, 9.viii.32 (*R. H. Beamer*);

Utah, Lehi, 1 ♂, 3.viii.06 (*no collector*); Idaho, Bliss, 2 ♀, 7.vii.31 (*H. T. Peters*)), located in the DeLong Collection, Ohio State University, were studied. The holotype and the male paratype from Oak Creek Canyon, Arizona, were missing from their points although their genitalia were still present in the vials. The date of the holotype and the locality of the allotype differ from that given in the original description.

The holotype ♂, allotype ♀ and 1 ♂, 1 ♀ paratype (UNITED STATES: Ariz., Oak Creek Cn., 9.viii.32 (*R. H. Beamer*)) of *Dikraneura termina* DeLong & Caldwell, located in the Snow Museum, University of Kansas, were studied. 1 ♂, 1♀ paratype (same data as holotype) and 1 ♀ paratype (UNITED STATES: Ariz., Oak Creek Cn., 31.vii.33 (*R. H. Beamer*)), in the DeLong Collection, were also studied. The vial associated with the holotype contains two abdomens, one of which is *D. absenta* and the other completely membranous and abnormal in shape, lacking posterior processes on the pygofer and with the aedeagus simple and tapered towards its apex as illustrated in the original description. The species described by DeLong & Caldwell as *D. termina* is undoubtedly a combination of these two specimens, the pygofer of *D. absenta* being associated with the aedeagus of the abnormal specimen. Since the perfect specimen associated with the holotype, and partially included in the original description, is *D. absenta* it is interpreted as the holotype and *D. termina* placed as a synonym of *D. absenta* which has page priority. As all members of the type series except one (a female) were taken together it may be confidently assumed that the abnormal specimen is associated with the other specimens and therefore rightfully belongs to *D. absenta*. The abdomens of the two male paratypes are missing.

The type series of *D. feirde* Beirne, located in the Canadian National Collection in Ottawa, is a mixed series of both *D. feirde*, as originally described, and *D. absenta*. The male genitalia associated with the holotype (CANADA: B. C., Summerland, 10.ix.1931 (*A. N. Gartrell*)) and one paratype (CANADA: B. C., Oliver, 23.v.1923 (*C. B. Garrett*)) are of *D. absenta* and do not agree with the original description of *D. feirde*. The remaining two paratypes are identical to the description of *D. feirde*, which however is the same as *D. shoshone* DeLong & Caldwell.

Biology. The recorded occurrence of *Dikraneura absenta* is limited to June and July in Idaho and Washington respectively (DeLong & Caldwell, 1937*a*) although material at hand shows it to be active from April to October in California. In Washington it is usually found on grasses although its hosts also include *Ambrosia* sp. (ragweed), *Medicago sativa* L. (alfalfa) and weeds (Wolfe, 1955*c*). The last three are considered however as accidental associations only while grasses alone afford host plants for both food and nymphal development. It is one of the most important leafhoppers in Washington causing damage to alfalfa, clover, grains and grasses and occasionally infests lawns. It is also reported (Beirne, 1952*b*) as a common species in parts of British Columbia.

Remarks. *Dikraneura absenta* is closely related to *D. carneola* (Stål), differing from the latter mainly by the absence of posterior subapical processes on the aedeagus and by the less well developed abdominal apodemes. Its close relationship to

D. carneola can be further seen by the presence in some individuals of short peg-like processes situated posterolaterally on the shaft just basad of the gonopore (Text-figs. 67 and 68). Such individuals occur in the same populations as those without these pegs, indicating the individual rather than clinal nature of this character. Externally, these two species, although very similar, may be separated by the presence in *D. absenta* of a usually more obtusely angled vertex, a pale yellow or cream venter to the abdomen and female pygofer, the often paler medial area of the pronotum and the much less distinct patch above the antenna and marginal patch between the sutures.

The external separation of *D. absenta* and the Nearctic forms of *D. variata* Hardy is more difficult. *D. variata* however is usually much paler with the ventral surface of the abdomen dark brown, although a dark brown suffusion over the anterior half of the abdominal sternites in some specimens of *D. absenta* makes this latter character unreliable.

Dikraneura aridella (Sahlberg)

(Text-figs. 75–86)

Typhlocyba citrinella Flor (*nec* Zetterstedt), 1861*a* : 386.
Notus aridellus Sahlberg, 1871*a* : 167.
Notus cephalotes Fieber, 1872*a* : 14 [nom. nud.].
Notus cephalotes Lethierry, 1874*a* : 272.

Length: ♂ 3·12–3·14 mm. (mean (3·13 mm.). ♀ 2·96–3·24 mm. (mean 3·12 mm.).

Similar to *D. variata* Hardy but with aedeagus distad of gonopore narrower and more elongate and with posterior processes extending anteriorly to level of posterior margin of basal apodeme.

Distribution. FINLAND (Sahlberg, 1871*a*; Ossiannilsson, 1946*c*; Lindberg, 1947*a*; Kontkanen, 1948, 1949*c*, 1952*b*; Linnavuori, 1949*a*, 1952*a*, *e*), SWEDEN (Sahlberg, 1871*a*; Ossiannilsson, 1934*a*, 1941*d*, 1946*c*; Kontkanen, 1948), NORWAY (Kontkanen, 1948), ENGLAND (Fieber, 1872*a*), DENMARK (Jacobsen, 1915*a*; Jensen-Haarup, 1918*b*, 1920*a*), BELGIUM (Lethierry, 1878*c*, 1892*b*), FRANCE (Lethierry, 1874*a*), GERMANY (Kirschbaum, 1868*b*; Melichar, 1896*a*), Prussia (Kirschbaum, 1868*b*; Matsumura, 1906*a*) and AUSTRIA (Löw, 1886*a*; Melichar, 1896*a*).

Specimens seen. SWEDEN: Östergötland, Vist, Sturefors, 1 ♂, 27.viii.32 (*Ossiannilsson*); Östergötland, Kimstad, 1 ♂, 13.vi.34 (*Ossiannilsson*); Östergötland, Rystad, Luestad, 1 ♀, 30.v.34 (*Ossiannilsson*); Östergötland, Rystad, Frösta, 1 ♀, 6.vi.33 (*Ossiannilsson*); Östergötland, Askeby, 1 ♀, 7.vi.32 (*Ossiannilsson*); Dalarne, Malingsbo, 1 ♂, 15.vii.1941 (*Ossiannilsson*).

The type series of *D. aridella*, located in the Universitetets Zoologiska Museum, Helsinki, consists of three specimens of which one is a female, another is a parasitized male and the third has its abdomen missing.[3] The male, labelled " Kuopio, Reinikainen ", was studied. Unfortunately, as a result of its condition, the abdominal apodemes are absent, the anterior halves of the styles and the connective membraneous and the aedeagus small and abnormal in shape, characters typical of parasitized males. The pygofer and subgenital plates were normal. A lectotype was not selected.

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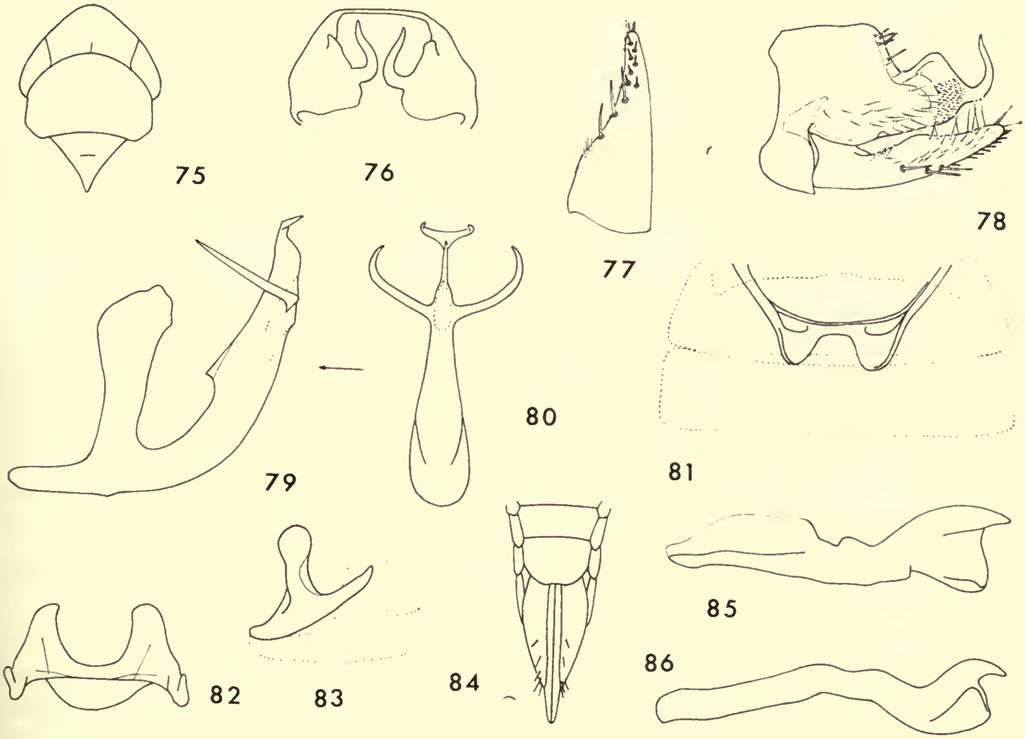
[3] Dr. M. Meinander, in correspondence

The holotype of *Notus cephalotes* Lethierry was not studied.

Biology. *Dikraneura aridella* appears to be active from early to late summer, its earliest recorded occurrence being in May (Lethierry, 1874*a*) and its latest in September (Jacobsen, 1915*a*; Jensen-Haarup, 1920*a*). Material at hand would also suggest a similar period of activity. It inhabits dry grass meadows (Flor, 1861*a*; Lindberg, 1947*a*) although it has also been found, although rare, in both rich swampy woods and rich moist grass herb woods (Linnavuori, 1952*a*). It apparently overwinters as the adult (Lindberg, 1947*a*).

Remarks. *Dikraneura aridella* is closely related to the only other European member of the genus, *D. variata* Hardy. The two species are identical externally and for many years were considered synonymous. The male genitalia are also similar with the exception of the aedeagus, which in *D. aridella* is narrower apically



Figs. 75–86. *Dikraneura aridella* (Sahlberg). 75, head, pronotum and scutellum, dorsal view; 76, male pygofer, posterior view; 77, left subgenital plate, ventral view; 78, male pygofer, valve and subgenital plate, left lateral view; 79, aedeagus, left lateral view; 80, aedeagus, posterior view in direction of arrow in fig. 79; 81, abdominal apodemes, dorsal view; 82, connective, anterodorsal view; 83, connective, left lateral view; 84, female genitalia, ventral view; 85, left style, dorsal view; 86, left style, left lateral view. Scale as in figs. 1.–16.

in lateral aspect, with the posterior processes more elongate and reaching to near the level of the posterior edge of the basal apodeme.

Dikraneura omani **sp. n.**

(Text-figs. 87–99)

Length: ♂ 3·62–4·18 mm. (mean 3·90 mm.). ♀ 4·14–4·28 mm. (mean 4·20 mm.).

Head with width equal to or slightly narrower than that of pronotum, vertex angularly produced with apex narrowly rounded in dorsal aspect, medial length 1¾–2 times length next eyes, narrowly rounded to face with latter slightly longer than wide, ocellocular area slightly wider than antennal fossa; pronotum with width increasing posteriorly.

Colour of face sordid cream or pale smoky brown, paling to cream laterally on genae, a small patch usually present above antenna pale whitish, vertex and pronotum whitish cream, with broad discal area of latter faintly sordid or pale brownish, sometimes pinkish, a broad band on each side of midline extending and increasing in width from apex of vertex to posterior margin of pronotum greenish yellow or orange-yellow, rarely deep orange or reddish, rarely indistinct; eyes testaceous. Scutellum yellow marked with cream; remainder of thorax dark brown marked laterally with yellow. Legs pale stramineous. Fore wings with basal area subhyaline greenish yellow, often sordid, sometimes reddish, claval vein, claval suture and *Cu* to base of apical cells sometimes whitish; apical half hyaline, often smoky brown, with veins yellowish, paling to cream apically. Hind wings hyaline with veins dark brown. Abdomen with dorsum and venter dark brown to black, with lateral margins of former, especially on posterior segments, pale fawn or yellow, sternites with lateral and posterior edges, or rarely entire sclerite, whitish or fawn; male pygofer and anal tube dark brown, valve pale fawn, rarely brown, subgenital plates pale fawn; female pygofer cream or pale brownish with dorsum and apex of ovipositor beyond pygofer dark brown, sternum VII concolorous with pygofer.

Male apodemes elongate, each with length approximately twice width, extending to posterior region of fourth segment.

Male genitalia with pygofer as in *D. variata* Hardy but with hair-like setae on lateral surface much fewer in number and with microspines restricted to posteroventral area. Aedeagus with preatrium and dorsally directed basal apodeme well developed, the latter expanding apically; shaft directed dorsally, tapering towards apex and terminating in a pair of narrow dorsally directed processes, their apices turned posteriorly; a pair of processes laterally near midlength, directed anterolaterally; gonopore elongate over distal half of posterior margin of shaft.

Female genitalia with lateral margins of sternum VII converging posteriorly, with posterior margin strongly produced with medial third transverse or sometimes slightly concave.

Holotype ♂. UNITED STATES: Ida., Coeur d'Alene, 9.vii.1935 (*Oman*), in U.S. National Museum.

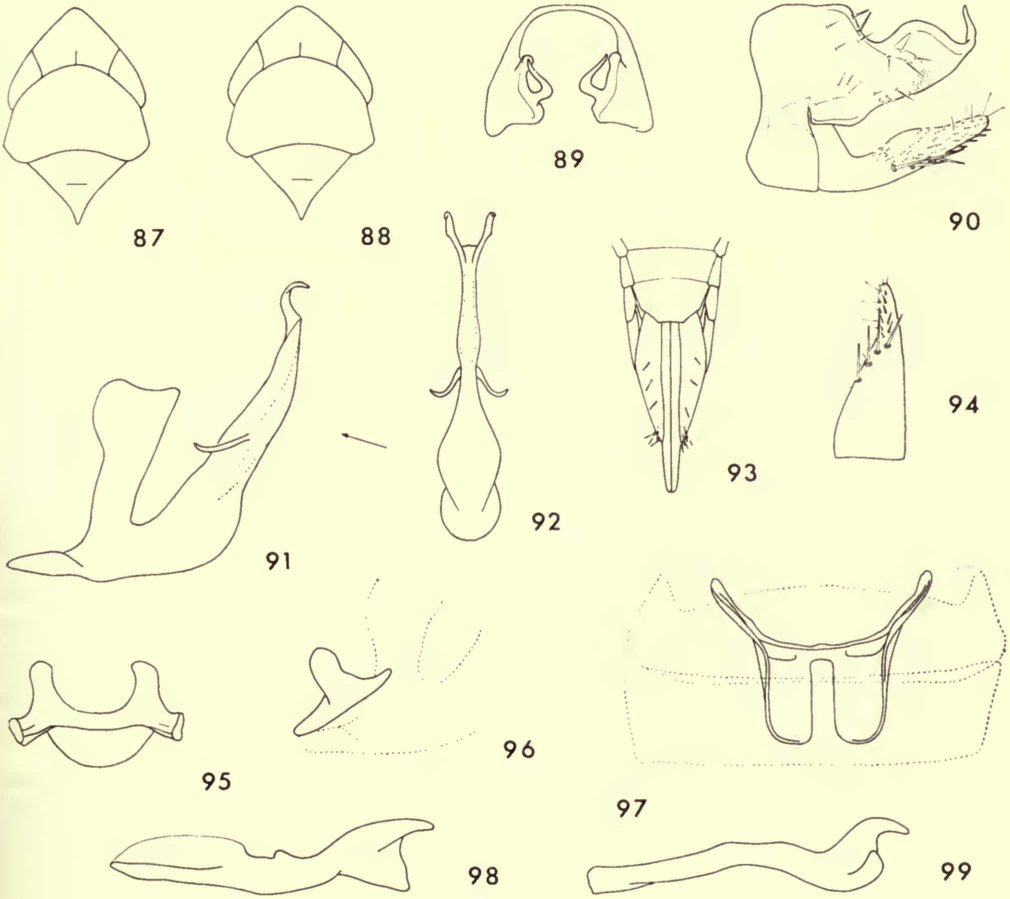
Allotype ♀. Same data as holotype, in U.S. National Museum.

Paratypes. UNITED STATES: 2 ♂, 5 ♀, same data as holotype, in U.S. National Museum; Ore., Bonneville, 2 ♂, 4.vii.1935 (*Oman*), in U.S. National Museum; Wash., Cliffdell, 1 ♂, 7.vii.1935 (*Oman*), in U.S. National Museum; Cal., Yosemite Nat. Pk., 1 ♂, 1 ♀, 1.viii.1940 (*D. E. Hardy*), in Snow Museum, University of Kansas; Cal., Yosemite Nat. Pk., 1 ♀, 1.viii.40 (*L. C. Kuitert*), in Snow Museum, University of Kansas; Cal., Yosemite Valley, 1 ♂, 10.vii.33 (*R. H. Beamer*), in DeLong Collection, Ohio State University; Cal., Yosemite, 3,880′–4,000′, 1 ♀, 21.v.1931 (*E. O. Essig*), in University of California, Berkeley; Cal., San Jacinto Mts., Idyllwild, 1 ♂, 22.v.1940 (*C. D. Michener*), in University of California, Berkeley; Cal., Sequoia Nat.

Pk., 1 ♂, 1 ♀, 6.viii.40 (*D. E. Hardy*), in Snow Museum, University of Kansas; Cal., Tulare Co., 1 ♂, 29.vii.29 (*R. H. Beamer*), in DeLong Collection, Ohio State University; Cal., Leona Heights, 1 ♀, 15.vii.33 (*R. H. Beamer*), in DeLong Collection, Ohio State University; CANADA: B. C., Victoria, 1 ♀, 9.vii.1923 (*K. F. Auden*), in Canadian National Collection, Ottawa.

This species is named in honour of Dr. P. W. Oman, who collected much of the material upon which this study is based.

Biology. From the specimens at hand, *Dikraneura omani* is seen to be present



FIGS. 87–99. *Dikraneura omani* sp. n. 87, head, pronotum and scutellum, dorsal view; 88, same; 89, male pygofer, posterior view; 90, male pygofer, valve and subgenital plate, left lateral view; 91, aedeagus, left lateral view; 92, aedeagus, posterior view in direction of arrow in fig. 91; 93, female genitalia, ventral view; 94, left subgenital plate, ventral view; 95, connective, anterodorsal view; 96, connective, left lateral view; 97, abdominal apodemes, dorsal view; 98, left style, dorsal view; 99, left style, left lateral view. Scale as in figs. 1–16.
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during July throughout its entire range. It has also been taken during May and August in California. Further details of its biology are unknown.

Remarks. *Dikraneura omani* is closely related to *D. carneola* (Stål) but may be distinguished from the latter species by the relatively larger size and shape of the aedeagus, the presence of microspines near the posteroventral region of the lateral surface of the pygofer, as in *D. variata* Hardy, and by the much longer abdominal apodemes. Externally *D. omani* and *D. carneola* are distinguished by the slightly larger size of *D. omani*, its possession of two longitudinal stripes on the vertex and pronotum, its head being narrower rather than wider than the pronotum and its more produced and acutely angled vertex. It may be distinguished from the sympatric species *D. rufula* Gillette, which also possesses approximately similar markings on the vertex and pronotum, by its usually greenish yellow rather than reddish coloration of these markings and by its larger size. The male genitalia of both species are also diagnostic.

Dikraneura shoshone DeLong & Caldwell

(Text-figs. 100–111)

Dikraneura carneola var. *shoshone* DeLong & Caldwell, 1937*a* : 27. **stat. n.**

Length: ♂ 3·54–3·98 mm. (mean 3·74 mm.).

Head with width slightly greater than that of pronotum, vertex moderately produced with apex broadly rounded in dorsal aspect, medial length approximately 1⅔ times length next eyes, narrowly or broadly rounded to face, with latter approximately as long as wide, ocellocular area 1¼ times width of antennal fossa; pronotum with width increasing only slightly posteriorly.

Colour of head cream or pale stramineous, paling laterally on genae, vertex on each side of midline faintly washed with yellow or orange, eyes testaceous. Pronotum pale cream, disc faintly sordid, rarely pinkish, with a patch on each side of midline over anterior half yellowish or pale orange; scutellum pale cream, basal triangles yellow or orange; remainder of thorax dark brown marked laterally with yellow. Legs pale stramineous. Fore wings with basal area subhyaline greenish yellow, sometimes pinkish, usually very pale; apical half hyaline with veins cream, apical cells sometimes faintly smoky brown. Hind wings hyaline, veins colourless or brownish. Abdomen with dorsum dark brown to black, with lateral margin sometimes yellow, venter dark brown to black, with posterior and lateral edge of sternites sometimes whitish or yellow; male pygofer and anal tube dark brown to black, subgenital plates pale cream, valve concolorous with plates or dark brown.

Male apodemes short, each with length approximately equal to width, sometimes absent.

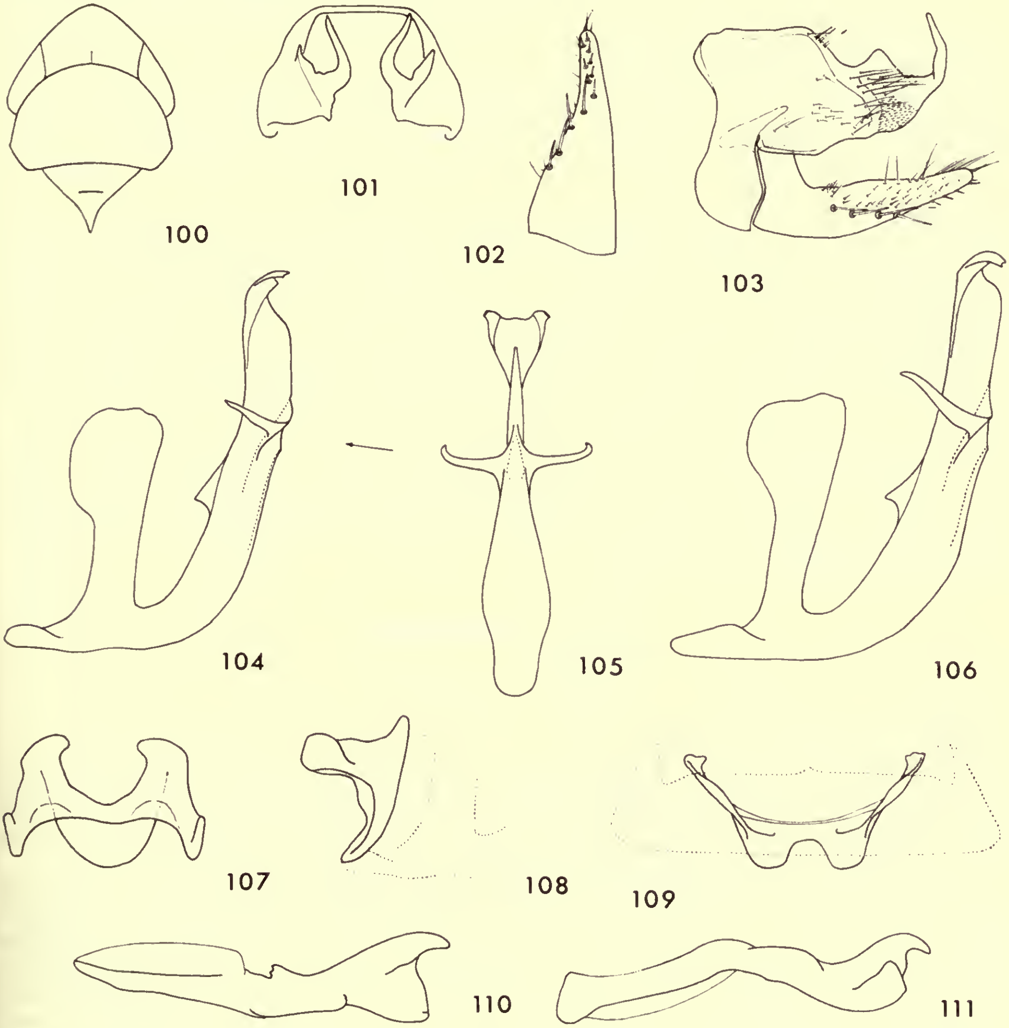
Male genitalia with pygofer as in *D. variata* Hardy but with lateral hair-like setae extending more dorsoposteriorly and microspines restricted to posteroventral area of lateral surface. Aedeagus with preatrium and dorsally directed basal apodeme well developed, the latter expanded apically; shaft directed dorsally, tapering in posterior aspect and terminating in a pair of short posteriorly directed processes, their bases expanded and united into a flattened shield-like plate, a pair of elongate processes, slightly variable in length, posterolaterally immediately distad of midlength, directed laterally and then anterodorsally, a pair of short triangular processes on anterior margin immediately basad of midlength; gonopore on posterior margin between bases of posterolateral processes.

Female unknown.

Distribution. British Columbia (Beirne, 1952*b*), Idaho (DeLong & Caldwell, 1937*a*).

Specimens seen. Canada: Alta., Banff, 2 ♂, 17.vi.50 (*B. P. Beirne*). United States: Mont., Hamilton, 1 ♂, 19.vii.1949 (*R. H. Beamer*); Wyo., Yellowstone Nat. Pk., 1 ♂, 12.vii.35 (*Oman*); Me., Bar Harbor, 1 ♂, no date (*W. Procter*).

New Records: Alberta, Montana, Wyoming, Maine.



Figs. 100–111. *Dikraneura shoshone* DeLong & Caldwell. 100, head, pronotum and scutellum, dorsal view; 101, male pygofer, posterior view; 102, left subgenital plate, ventral view; 103, male pygofer, valve and subgenital plate, left lateral view; 104, aedeagus (Maine), left lateral view; 105, aedeagus, posterior view in direction of arrow in fig. 104; 106, aedeagus (Banff, Alberta), left lateral view; 107, connective, anterior view; 108, connective, left lateral view; 109, abdominal apodemes, dorsal view; 110, left style, dorsal view; 111, left style, left lateral view. Scale as in figs. 1–16.

The holotype ♂ and 2 ♂ paratypes (UNITED STATES: Ida., Shoshone Basin, 27.vii.30 (*no collector*)) of *D. shoshone*, located in the DeLong Collection, Ohio State University, were studied.

As stated under *D. absenta* DeLong & Caldwell, the type series of *D. feirde* Beirne, located in the Canadian National Collection in Ottawa, is a mixed series, the holotype ♂ and 1 ♂ paratype being *D. absenta* and the remaining 2 ♂ paratypes (CANADA: B. C., Chilcotin, 29.vii.1920 (*E. R. Buckell*) and B. C., Hedley, N. P. Mine, 7.viii.1934 (*A. N. Gartrell*)) being *D. shoshone*.

Biology. Specimens at hand of *D. shoshone* were taken during June in Alberta and July in both Montana and Wyoming. DeLong & Caldwell (1937*a*) record it for July in Idaho and Beirne (1952*b*) records it for July and August in British Columbia.

Remarks. *D. shoshone* is most closely related to *D. variata* Hardy and *D. ossia* Beirne but may be readily distinguished from both these species by the male genitalia. The pygofer of all three species is very similar, although that of *D. shoshone* differs from that of *D. variata* by the setae on the lateral surface extending more dorsoposteriorly and the posterior microspines being more restricted in distribution. It differs from that of *D. ossia* by having the posterior process more elongate and directed more dorsally rather than posteriorly. The aedeagus of *D. shoshone* is perhaps most closely related to that of *D. ossia* in general size and shape of the shaft and the basal expansion of the apical processes into a shield-like plate. They differ however in the length of the apical processes beyond the plate and the fact that in *D. shoshone* the processes on the shaft arise posterolaterally as in *D. variata* rather than laterally as in *D. ossia*.

Dikraneura ossia Beirne

(Text-figs. 112–123)

Dikraneura ossia Beirne, 1952*b* : 251.

Length: ♂ 3·20–3·60 mm. (mean 3·41 mm.). ♀ 3·50–3·82 mm. (mean 3·67 mm.).

Head with width equal to or slightly greater than that of pronotum, vertex moderately produced with apex broadly rounded in dorsal aspect, medial length 1½ times length next eyes, broadly rounded to face with latter approximately as long as wide, ocellocular area equal in width to antennal fossa; pronotum with width increasing slightly posteriorly.

Colour of head pale brownish or sordid cream, paling laterally over genae, vertex sometimes washed with yellow with midline pale cream; eyes testaceous. Pronotum cream with disc sordid, pinkish or pale brownish, anterior margin on each side of midline yellowish; scutellum yellow; remainder of thorax dark brown. Legs pale stramineous. Fore wings with basal area faintly subhyaline greenish yellow; apical half hyaline with veins creamish. Hind wings hyaline with veins dark brown. Female abdomen with dorsum dark brown, venter pale yellowish or cream with anterior half of sternites dark brown; female pygofer pale yellowish or cream with dorsum and apex of ovipositor beyond pygofer dark brown, sternum VII pale yellowish or cream. (Colour of male abdomen not recordable).

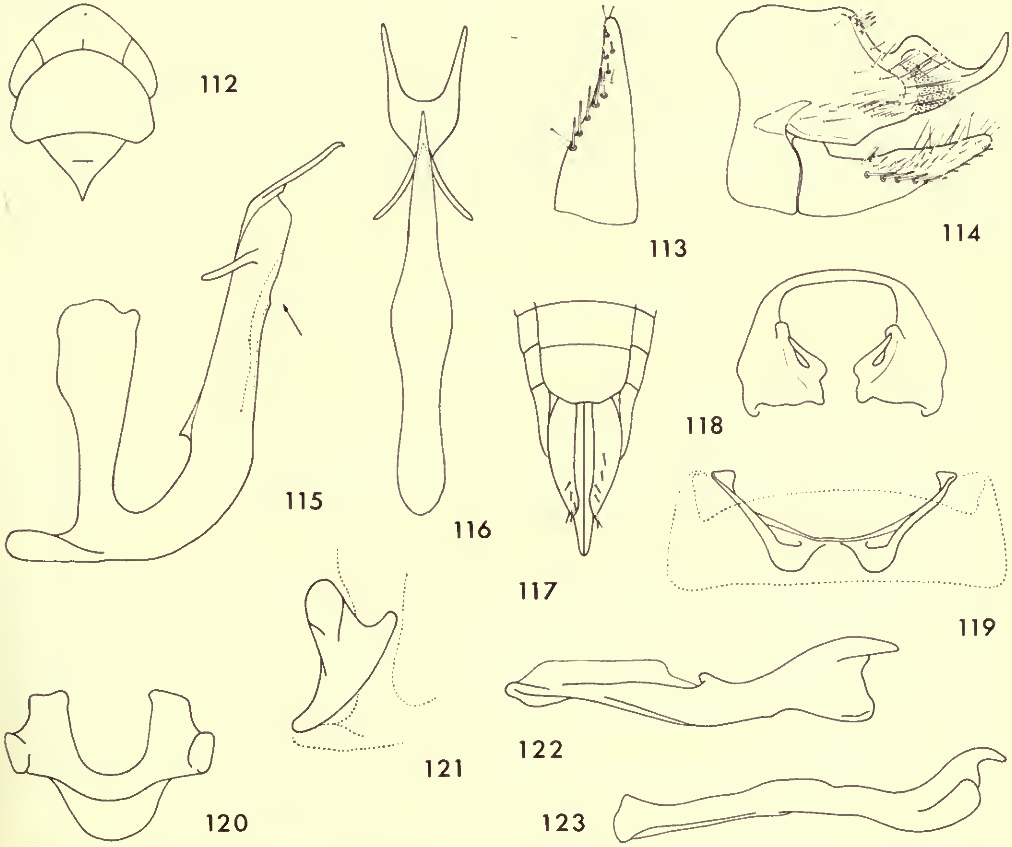
Male apodemes short, each with length subequal to width, directed dorsoposteriorly, sometimes absent.

Male genitalia with pygofer as in *D. variata* Hardy but with basal part of process directed more posteriorly. Aedeagus with preatrium and dorsally directed basal apodeme well developed, the latter expanded apically; shaft elongate, straight, directed dorsally, tapering towards apex in posterior aspect and terminating in a pair of elongate, dorsoposteriorly directed processes, their bases expanded and united into a flattened plate, a pair of processes laterally immediately basad of apex, directed anterolaterally, a pair of short triangular processes on anterior margin immediately basad of midlength; gonopore on posterior margin immediately basad of lateral processes.

Female genitalia with sternum VII as in *D. variata* Hardy.

Distribution. Manitoba (Beirne, 1952*b*).

Specimens seen. UNITED STATES: Alaska, College, 1 ♂, 5 ♀, 22.ix.1943 (*J. C. Chamberlin*); Alaska, Circle Hot Springs, 900′, 1 ♂, 4.viii.1951 (*H. C. Severin*). CANADA: Yukon, Dawson, 1 ♂, 16.vi.1949 (*W. W. Judd*); N. W. T., Norman Wells, 1 ♂, 23.vii.1949 (*W. R. M. Mason*); Man., Swan River, 1 ♂, 2.viii.37 (*R. H. Beamer*).



FIGS. 112–123. *Dikraneura ossia* Beirne. 112, head, pronotum and scutellum, dorsal view; 113, left subgenital plate, ventral view; 114, male pygofer, valve and subgenital plate, left lateral view; 115, aedeagus, left lateral view; 116, aedeagus, posterior view in direction of arrow in fig. 115; 117, female genitalia, ventral view; 118, pygofer, posterior view; 119, abdominal apodemes, dorsal view; 120, connective, anterodorsal view; 121, connective, left lateral view; 122, left style, dorsal view; 123, left style, left lateral view. Scale as in figs. 1–16.

New Records: Alaska, Yukon, North West Territory.

The holotype ♂, allotype ♀ and 2 ♂, 2♀ paratypes (CANADA: Manitoba, Birch River, 3.viii.1937 (*R. H. Beamer*)) and 1 ♂ paratype (CANADA: Manitoba, Mafeking, 3.viii.1937 (*R. H. Beamer*)), all located in the Snow Museum, University of Kansas, were studied together with 2 ♂ paratypes (CANADA: Saskatchewan, Saskatoon, 17.v.1926 (*K. M. King*) and Saskatchewan, Saskatoon, 8.viii.192– (*K. M. King*)) located in the Canadian National Collection in Ottawa. The type series of this species is mixed, the last two paratypes located in Ottawa being the closely related species *D. hungerfordi* Lawson. The former of these two specimens has the body missing from the point.

Biology. *Dikraneura ossia* has been previously recorded only during August in Manitoba (Beirne, 1952*b*). Specimens at hand show it to be present as early as June in the Yukon and as late as September in Alaska.

Remarks. *Dikraneura ossia* is closely related to *D. hungerfordi* Lawson and is further discussed under the latter. The specimens of *D. ossia* from College, Alaska, differ in colour from the majority of specimens, having the disc of the pronotum and the basal half of the fore wings pink with vein *Cu*, to the base of the apical cell, whitish.

Dikraneura hungerfordi Lawson

(Text-figs. 124–137)

Dikraneura hungerfordi Lawson, 1930*e* : 39.

Length: ♂ 3·08–3·40 mm. (mean 3·25 mm.). ♀ 3·30–3·60 mm. (mean 3·45 mm.).

Form and colour as in *D. ossia* Beirne but with vertex slightly more produced in general, head more markedly wider than pronotum and with ventral surface of abdomen, except for lateral and posterior edges of sternites, dark brown to black. (Colour of abdomen not recordable).

Male apodemes as in *D. ossia* Beirne.

Male genitalia with pygofer tapering abruptly posteriorly in lateral aspect and terminating in a narrow finger-like process directed posteromedially and then abruptly dorsolaterally and posteriorly, a small dorsal convexity immediately basad of process; dorsolateral margin with a variable number of spine-like setae near midlength; lateral surface with short hair-like setae over medial area and long spine-like setae posteriorly. Aedeagus as in *D. ossia* Beirne but with shaft arched posteriorly to variable extent and with apical processes relatively shorter, narrower and more divergent.

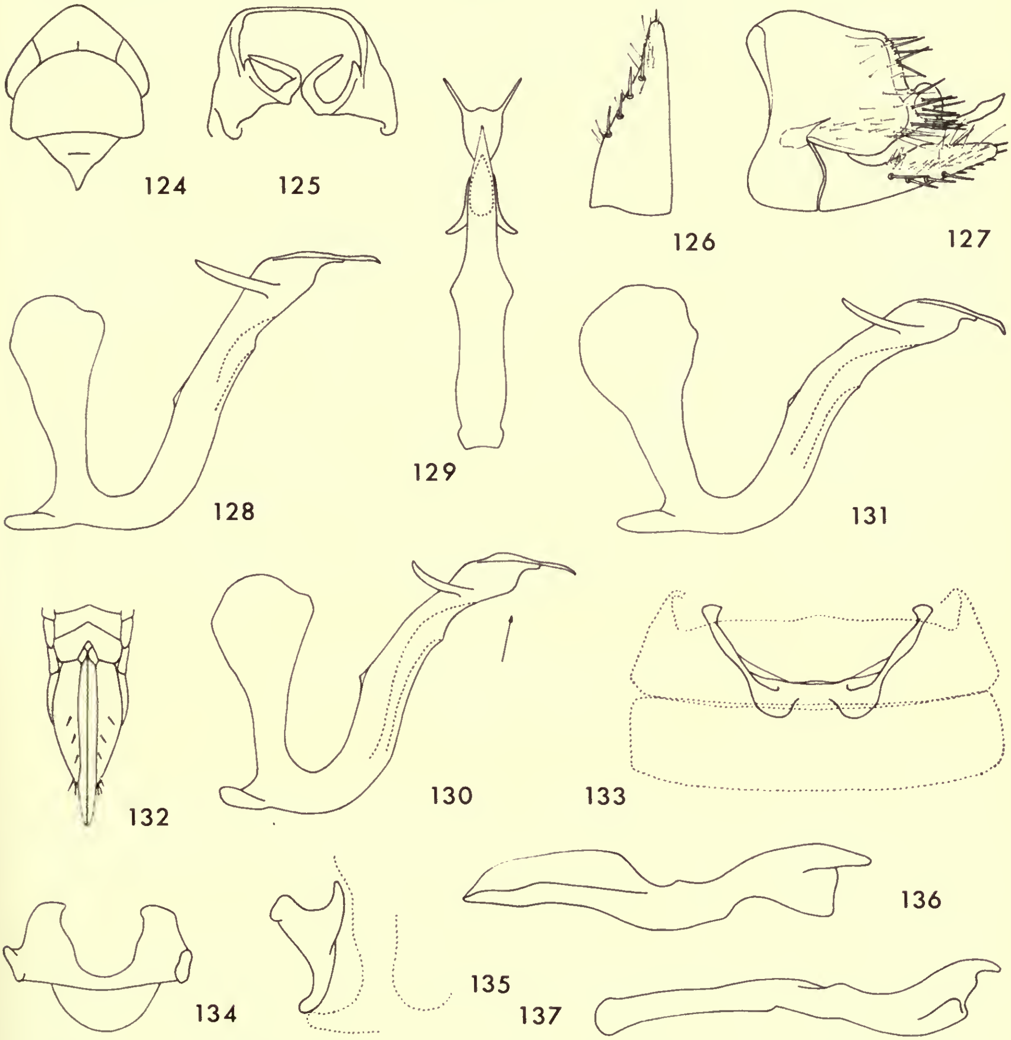
Female genitalia with lateral margins of sternum VII broadly rounded to transverse posterior margin, the latter deeply incised over medial third.

Distribution. Michigan and Ontario (Lawson, 1930*e*).

Specimens seen. CANADA: Alta., Elkwater, 1 ♂, 23.ix.1951 (*A. R. Brooks*); Sask., Saskatoon, 1 ♂, 12.v.1926, 2 ♀, 17.v.1926, 1 ♀, 26.v.1926, 1 ♀, 12.vi.1926, 3 ♀, 8.vi.1929, 1 ♀, 22.vii.1929, 1 ♂, 12.vii.1926 (*K. M. King*). UNITED STATES: Mich., Cheboygan Co., 1 ♂, 21.vii.1941 (*C. Hubbs*); Mich., Cheboygan Co., 1 ♀, 30.vii.47 (*H. B. Hungerford*); Pa., Spring Br., 1 ♂, 1 ♀, 11.v.45 (*no collector*).

New Records: Alberta, Saskatchewan, Pennsylvania.

The holotype ♂, allotype ♀ and 1 ♀ paratype (UNITED STATES: Mich., Douglas Lake, 20.vii.1925 (*H. B. Hungerford*)), 1 ♀ paratype (UNITED STATES: Mich., Douglas Lake, 14.viii.1925 (*H. B. Hungerford*)) and 1 ♀ paratype (CANADA: Ont.,



FIGS. 124–137. *Dikraneura hungerfordi* Lawson. 124, head, pronotum and scutellum, dorsal view; 125, male pygofer, posterior view; 126, left subgenital plate, ventral view; 127, male pygofer, valve and subgenital plate, left lateral view; 128, aedeagus (Elkwater, Alberta), left lateral view; 129, aedeagus, ventral view in direction of arrow in fig. 130; 130, aedeagus (Cheboygan Co., Michigan), left lateral view; 131, same (Spring Br., Pennsylvania); 132, female genitalia, ventral view; 133, abdominal apodemes, dorsal view; 134, connective, anterior view; 135, connective, left lateral view; 136, left style, dorsal view; 137, left style, left lateral view. Scale as in figs. 1–16.

Brockville, 5. viii. 1903 (*W. Metcalfe*)), located in the Snow Museum, University of Kansas, were studied. The 2 ♂ paratypes of *D. ossia* Beirne from Saskatoon, Saskatchewan, located in the Canadian National Collection in Ottawa, also belong to the present species.

Biology. *Dikraneura hungerfordi* is active from early to late summer. Lawson (1930*e*) recorded it during July and August in Michigan and August in Ontario while specimens at hand show it to be active as early as May in both Saskatchewan and Pennsylvania and as late as September in Alberta.

Remarks. *Dikraneura hungerfordi* is closely related to *D. ossia* Beirne as can be seen by the shape of the aedeagus which differs mainly by the fact that in *D. hungerfordi* it is arched posteriorly, has the apical processes more slender and directed posterolaterally and the triangular processes on the anterior surface of the shaft minute. This arching of the shaft varies in degree between individuals (cf. Text-figs. 128, 130 and 131) and may assume a near upright position approaching that of *D. ossia*. In addition to the aedeagus, however, the two species show marked differences in both the male pygofer and the female VIIth sternum. Externally, in colour and appearance, the two species are very similar. There is a tendency, however, in *D. hungerfordi* for the vertex to be slightly more produced and for the head to be more markedly wider than the pronotum. *D. ossia* is also slightly longer.

Geographically, *D. ossia* Beirne is more northern in distribution than *D. hungerfordi* although their ranges appear to overlap in the area of Alberta, Saskatchewan and Manitoba. There is no evidence of intermediate forms in the latter area to suggest a possible subspecific relationship although further collecting is undoubtedly required.

Dikraneura abnormis (Walsh)

(Text-figs. 138–150)

Chloroneura abnormis Walsh, 1862*a* : 149.

Length: ♂ 3·76–3·94 mm. (mean 3·88 mm.). ♀ 3·96–4·08 mm. (mean 4·01 mm.).

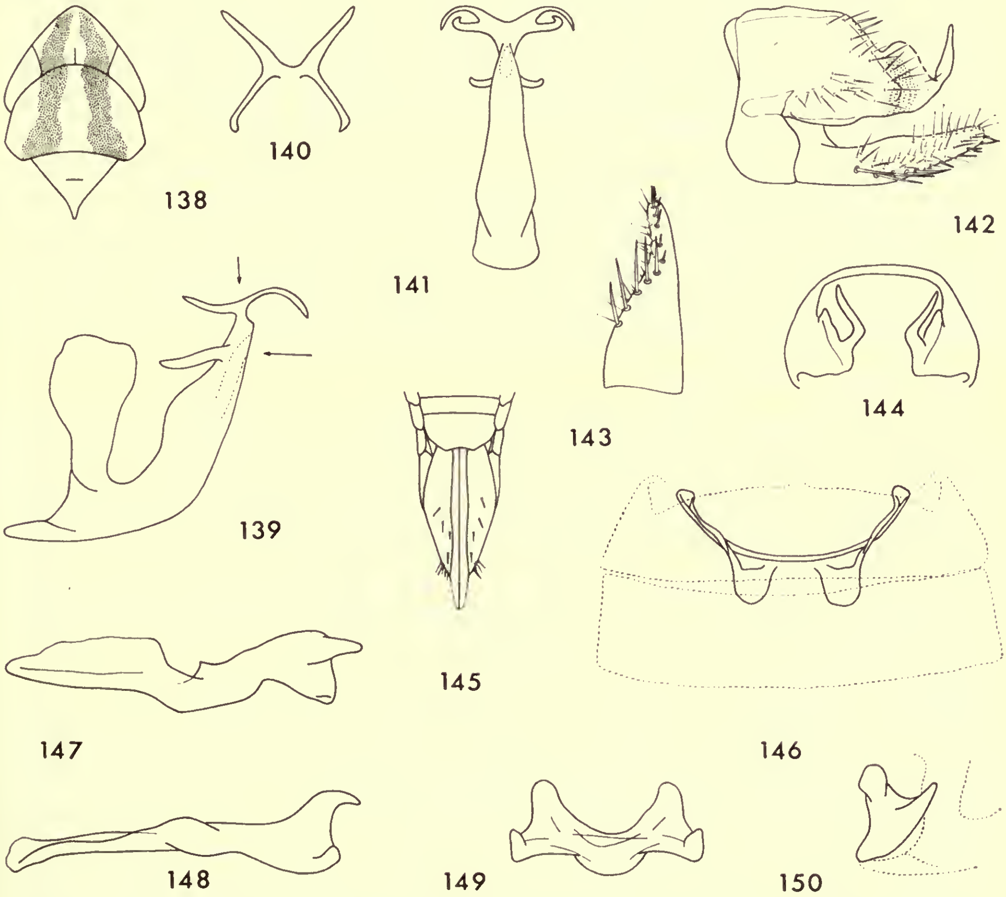
Head with width equal to or slightly greater than that of pronotum, vertex angularly produced with apex acutely rounded in dorsal aspect, medial length nearly twice length next eyes, narrowly rounded to face with latter approximately as long as wide, ocellocular area equal in width to antennal fossa; pronotum with width increasing posteriorly.

Colour of face sordid cream or pale brownish, paling laterally over genae, vertex pale yellowish or whitish cream; eyes testaceous. Pronotum and scutellum pale yellowish or whitish cream, disc of former faintly sordid; with a broad longitudinal vitta on each side of midline, from apex of vertex to posterior margin of pronotum red, sometimes faintly so or yellow; remainder of thorax dark brown marked laterally with yellow. Legs pale stramineous. Fore wings with basal area subhyaline red, sometimes faintly so or yellow, with internal edge of clavus, claval vein, claval suture, *Cu* to base of apical cell and basal half of cell *Cu*, whitish, costal margin pale yellowish; apical half hyaline, faintly smoked dark brown, veins yellowish. Hind wings hyaline, veins dark brown. Abdomen with dorsum dark brown to black, with lateral margin yellow, venter yellow, anterior region of sternites often brown; male pygofer dark brown, paling ventrally to light brown, sometimes uniformly light brown; anal tube light brown, valve and subgenital plates concolorous cream, sometimes smoky; female pygofer pale stramineous with dorsum and apex of ovipositor beyond pygofer dark brown, sternum VII pale yellow.

Male apodemes each with length less than width or subequal, directed dorsoposteriorly to anterior region of fourth segment.

Male genitalia with pygofer as in *D. variata* Hardy. Aedeagus with preatrium only slightly developed, basal apodeme well developed, directed dorsally and expanded apically; shaft directed dorsally, short, exceeding basal apodeme only slightly in length, tapering towards apex and terminating in a pair of laterally directed processes which bifurcate more or less immediately into a pair of divergent arms of subequal length, the entire structure appearing X-shaped in dorsal aspect; a pair of lateral processes just basad of apex, directed anterolaterally; gonopore on posterior margin, level with lateral processes.

Female genitalia with posterior margin of sternum VII broadly rounded, slightly concave medially.



FIGS. 138–150. *Dikraneura abnormis* (Walsh). 138, head, pronotum and scutellum, dorsal view; 139, aedeagus, left lateral view; 140, apical processes of aedeagus, dorsal view in direction of arrow in fig. 139; 141, aedeagus, posterior view in direction of arrow in fig. 139; 142, male pygofer, valve and subgenital plate, left lateral view; 143, left subgenital plate, ventral view; 144, male pygofer, posterior view; 145, female genitalia, ventral view; 146, abdominal apodemes, dorsal view; 147, left style, dorsal view; 148, left style, left lateral view; 149, connective, anterodorsal view; 150, connective, left lateral view. Scale as in figs. 1–16.

Distribution. British Columbia (Downes, 1924*a*), South Dakota (Severin, 1921*c*), Minnesota (Medler, 1943*a*), Wisconsin (Sanders & DeLong, 1917*a*; Ball & DeLong, 1925*a*), Iowa (Osborn & Ball, 1897*a*; Ball & DeLong, 1925*a*), Kansas (Crevecoeur, 1905*a*; Tucker, 1907*a*; Crumb, 1911*a*; Lawson, 1920*a*, 1929*a*; Ball & DeLong, 1925*a*), Missouri (Gibson & Cogan, 1915*a*; Ball & DeLong, 1925*a*), Oklahoma (Davidson & Shackleford, 1929*a*), Texas (Gillette, 1898*a*; Fletcher, 1930*a*), Illinois (Walsh, 1862*a*; Gillette, 1898*a*; Ball & DeLong, 1925*a*; McAtee, 1926*c*; Jones, 1946*a*), Kentucky (Young, 1949), Tennessee (DeLong, 1916*a*), North Carolina (Metcalf, 1915*a*; Brimley, 1938*a*), South Carolina (Lathrop, 1917*a*, 1919*a*), Georgia (Fattig, 1955*a*), Virginia (Ball & DeLong, 1925*a*; Stearns, 1927*a*), D.C. (Gillette, 1898*a*; Ball & DeLong, 1925*a*), Ohio (Osborn, 1900*e*, 1928*b*; Ball & DeLong, 1925*a*; Johnson, 1935*a*), Pennsylvania (Wirtner, 1904*a*; Ball & DeLong, 1925*a*), New York (Ball & DeLong, 1925*a*), Connecticut (DeLong, 1923*a*; Ball & DeLong, 1925*a*), Quebec (Moore, 1944*a*, 1950*a*), Bermuda (Hartzell, 1954*a*).

Specimens seen. UNITED STATES: Kans., La Cygne, 1 ♂, 5 ♀, 12.x.1948, 3 ♂, 1 ♀, 10.x.1948 (*R. H. Beamer*); Ill., Marshall, 2 ♂, 27.ix.1934 (*Frison & Ross*); Ill., Rocky Branch, Dolson, 2 ♂, 6 ♀, 18.vii.1934 (*DeLong & Ross*); Pa., Chambersburg, 1 ♀, 10.ix.20 (*T. L. Guyton*); Md., Plummers Id., 3 ♂, 2 ♀, 8.vi.13, 1 ♂, 17.vi.13, 1 ♀, 4.vii.14, 1 ♀, 6.iv.1913, 1 ♀, 9.v.13 (*W. L. McAtee*); Md., nr. Plummers Id., 1 ♀, 28.iv.1915, 1 ♀, 24.v.1914 (*W. L. McAtee*).

New Records: Maryland.

Walsh's collection, which was housed in Chicago, was partly destroyed by *Anthrenus* and the remainder by fire (Horn, 1926). In his original description, Walsh makes no reference to the locality of *D. abnormis* although he does, in connection with the other two species described in the same paper, mention Bloomington and Rock Island, Illinois. In view of his long association with the state of Illinois (Howard, 1930; Essig, 1931*a*) it is highly probable that his original type series of *D. abnormis* was also from that state. However, in the absence of suitable topotypic material, a neotype was not designated.

Biology. *Dikraneura abnormis* is active from the spring until the later summer, at least over the southeastern part of its range, having been taken as early as March in North Carolina (Metcalf, 1915*a*; Brimley, 1938*a*) and as late as November in Kansas (Crumb, 1911*a*) and Virginia (Stearns, 1927*a*). It has been recorded from grasses (Wirtner, 1904*a*; Crumb, 1911*a*; Gibson & Cogan, 1915*a*; DeLong, 1916*a*; Lawson, 1920*a*; DeLong, 1923*a*; Fletcher, 1930*a*; Fattig, 1955*a*), weeds (Crevecoeur, 1905*a*; Crumb, 1911*a*; DeLong, 1916*a*), sedge (Crumb, 1911*a*), shrubs (DeLong, 1916*a*), vetch (Fattig, 1955*a*), undergrowth in oak woods (Crumb, 1911*a*), canebrakes (DeLong, 1916*a*) and *Aristida* fields (Fletcher, 1930*a*). Specific host plants are *Parsonia* sp. in pasture (Crumb, 1911*a*), *Carpinus* sp. (Johnson, 1935*a*), *Paspalum vaginatum* Sw. (Hartzell, 1954*a*) and *Stenotaphrum secundatum* (Walt.) Kuntze (Hartzell, 1954*a*). It has been recorded as injuring wheat in Texas (Gillette, 1898*a*), grain in Connecticut (DeLong, 1923*a*) and pasture in Georgia (Fattig, 1955*a*).

Remarks. The variation in the degree of development of the red colouration observed in the specimens at hand appears to be a seasonal phenomenon, those taken in April, May and June as well as September and October having the red colour well marked compared with those taken in July which have the pigment poorly developed.

In his original description of this species, Walsh refers to the vittae on the vertex and pronotum as being " more or less obsolete ", that on the anal vein as being " obscure " and sometimes, together with another parallel to it but nearer to the costa, " obsolete ", while the abdomen is described as " black ". Although this description applies equally to the closely related species *D. etiolata* sp. n. as well as the July forms of the present species, the latter is interpreted as *D. abnormis* in view of its occurence in Illinois, *D. etiolata* being more easterly in distribution. The description of *D. abnormis* given by other workers (DeLong, 1916*a*, 1923*a*; Lawson, 1920*a*; McAtee, 1924*a*; Ball & DeLong, 1925*a*; Osborn, 1928*b*; Johnson, 1935*a*), in which emphasis is placed on the possession of distinct vittae, further suggests that the present species is the true *abnormis*. DeLong & Caldwell (1937*a*) however, in the only previous illustration of the male genitalia of " *D. abnormis* ", figure those of the following species, *D. etiolata*, although they make no mention of colour.

Dikraneura abnormis is undoubtedly very closely related to *D. etiolata* sp. n. from which it differs by the more robust aedeagus with its X-shaped apical processes, a more produced and acutely angled vertex and the more intensely developed red colouration of the dorsal vittae and fore wings.

Dikraneura etiolata sp. n.

(Text-figs. 151–163)

Length: ♂ 3·60–3·86 mm. (mean 3·78 mm.). ♀ 3·88–3·96 mm. (mean 3·92 mm.).

Head with width equal to or slightly greater than that of pronotum, vertex angularly produced, sometimes more so in female, with apex broadly rounded in dorsal aspect, medial length approximately 1½ times length next eyes, narrowly rounded to face with latter approximately as long as wide, ocellocular area equal in width to antennal fossa; pronotum with lateral margins more or less parallel.

Colour of head cream, paling laterally over genae and posterior half of vertex, frontoclypeus to near apex, and marginal sutures, washed with yellow, vertex with medial line whitish cream, a diffuse patch on each side yellow; eyes testaceous. Pronotum whitish cream, disc faintly sordid, a broad band on each side of midline yellow often tinged with red over its posterior two-thirds; scutellum whitish cream, basal angles yellow; remainder of thorax dark brown marked laterally with yellow. Legs pale stramineous. Fore wings with basal area subhyaline greenish yellow, often tinged with red, occasionally pale, with internal edge of clavus, claval suture and *Cu* to base of apical cell whitish; apical half hyaline, faintly smoked with dark brown near apex, veins yellowish, paling to whitish apically. Hind wings hyaline, veins whitish. Abdomen with dorsum black, lateral margin yellow, venter dark brown with lateral and posterior margins of sternites yellow, entire sternite predominantly yellow in female; male pygofer and anal tube light brown, valve and subgenital plates concolorous cream; female pygofer pale stramineous with dorsum and ovipositor beyond pygofer dark brown, sternum VII pale stramineous.

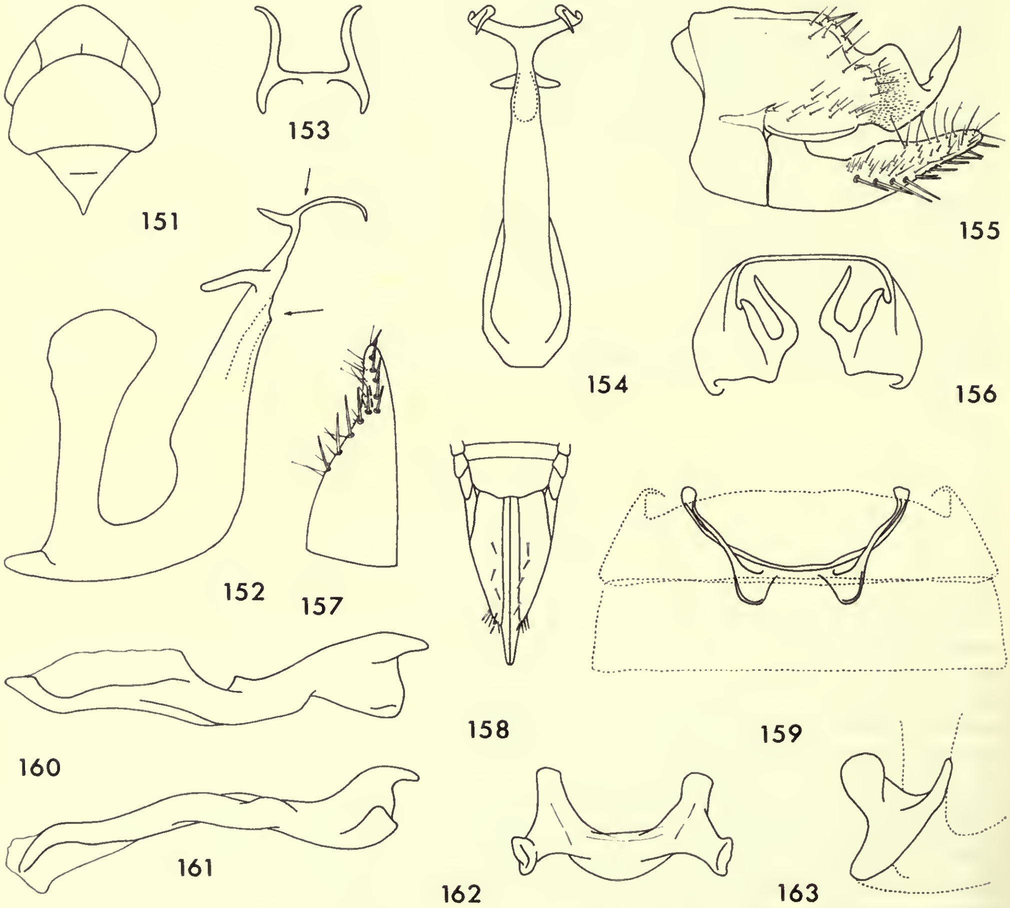
Male apodemes as in *D. abnormis* (Walsh).

Male genitalia as in *D. abnormis* (Walsh) but relatively larger, with aedeagus more elongate, apical processes H-shaped in dorsal aspect and with posterior branches approximately twice length of anterior ones and with lateral processes distad of gonopore.

Female genitalia with sternum VII as in *D. abnormis* (Walsh).

Holotype ♂. UNITED STATES: Mich., Lake Gogebic, 18.viii.37 (*R. H. Beamer*), in Snow Museum, University of Kansas.

Allotype ♀. UNITED STATES: Pa., Port Matilda, 24.viii.18 (*J. G. Sanders*), in DeLong Collection, Ohio State University.



FIGS. 151–163. *Dikraneura etiolata* sp. n. 151, head, pronotum and scutellum, dorsal view; 152, aedeagus, left lateral view; 153, apical processes of aedeagus, dorsal view in direction of arrow in fig. 152; 154, aedeagus, posterior view in direction of arrow in fig. 152; 155, male pygofer, valve and subgenital plate, left lateral view; 156, male pygofer, posterior view; 157, left subgenital plate, ventral view; 158, female genitalia, ventral view; 159, abdominal apodemes, dorsal view; 160, left style, dorsal view; 161, left style, left lateral view; 162, connective, anterodorsal view; 163, connective, left lateral view. Scale as in figs. 1–16.

Paratypes. UNITED STATES: 1 ♂, same data as holotype, in Snow Museum, University of Kansas; Mich., Gogebic, 1 ♂, 18.viii.37 (*R. H. Beamer*), in Snow Museum, University of Kansas; 3 ♂, 3 ♀, same data as allotype, in DeLong Collection, Ohio State University.

Remarks. In addition to the male genitalia, *Dikraneura etiolata*, known only from Pennsylvania and Michigan, differs from *D. abnormis* (Walsh) by the shorter and more obtusely angled vertex, the less marked development of the longitudinal red vittae on the vertex and pronotum and the difference in colouration of the ventral surface of the abdomen. The true relationship of these two closely similar forms is not clear at the moment in view of the relatively short series of specimens available. The possibility that they are seasonal forms of the same species is unlikely since although *D. etiolata* has been taken only during the autumn, *D. abnormis* is known throughout the year. In view of the large number of differences and the absence of intermediate forms, they are currently considered as distinct species.

Dikraneura urbana Ball & DeLong

(Text-figs. 164–176)

Dikraneura abnormis var. *urbana* Ball & DeLong, 1925*a* : 329.
Dikraneura urbana Ball & DeLong; DeLong & Caldwell, 1937*a* : 30.

Length: ♂ 3·36–4·00 mm. (mean 3·63 mm.). ♀ 3·32–4·04 mm. (mean 3·72 mm.).

Head with width equal to or slightly narrower than that of pronotum, vertex angularly produced with apex acutely rounded in dorsal aspect, medial length $1\frac{3}{4}$–2 times length next eyes, narrowly rounded to face with latter equal to or slightly longer than wide, ocellocular area equal in width to antennal fossa; pronotum with width increasing posteriorly.

Colour of head cream with anteclypeus, frontoclypeus to near anterior margin, marginal sutures and disc of vertex on each side of midline washed with yellow, sometimes faintly so, rarely uniformly cream or brownish cream with above listed areas only slightly darker; eyes testaceous. Pronotum cream, disc sordid, pale brownish or pinkish, a broad band on each side of midline diffusely yellow, sometimes contiguous, sometimes pale and indistinct; scutellum yellowish; remainder of thorax with dorsum dark brown, venter pale stramineous or yellowish. Legs pale stramineous. Fore wings with basal area subhyaline greenish yellow, often pale; apical half hyaline, faintly smoked with brown, with veins yellowish, paling to creamish apically. Hind wings hyaline, veins dark brown. Abdomen with dorsum dark brown, lateral edges yellow, venter yellow, rarely brown with posterior edge of sternites yellow; male pygofer dark brown, paling ventrally to light brown or cream, anal tube light or dark brown; valve and subgenital plates concolorous cream; female pygofer pale stramineous with dorsum sometimes washed with dark brown, ovipositor uniformly pale stramineous, sternum VII pale stramineous.

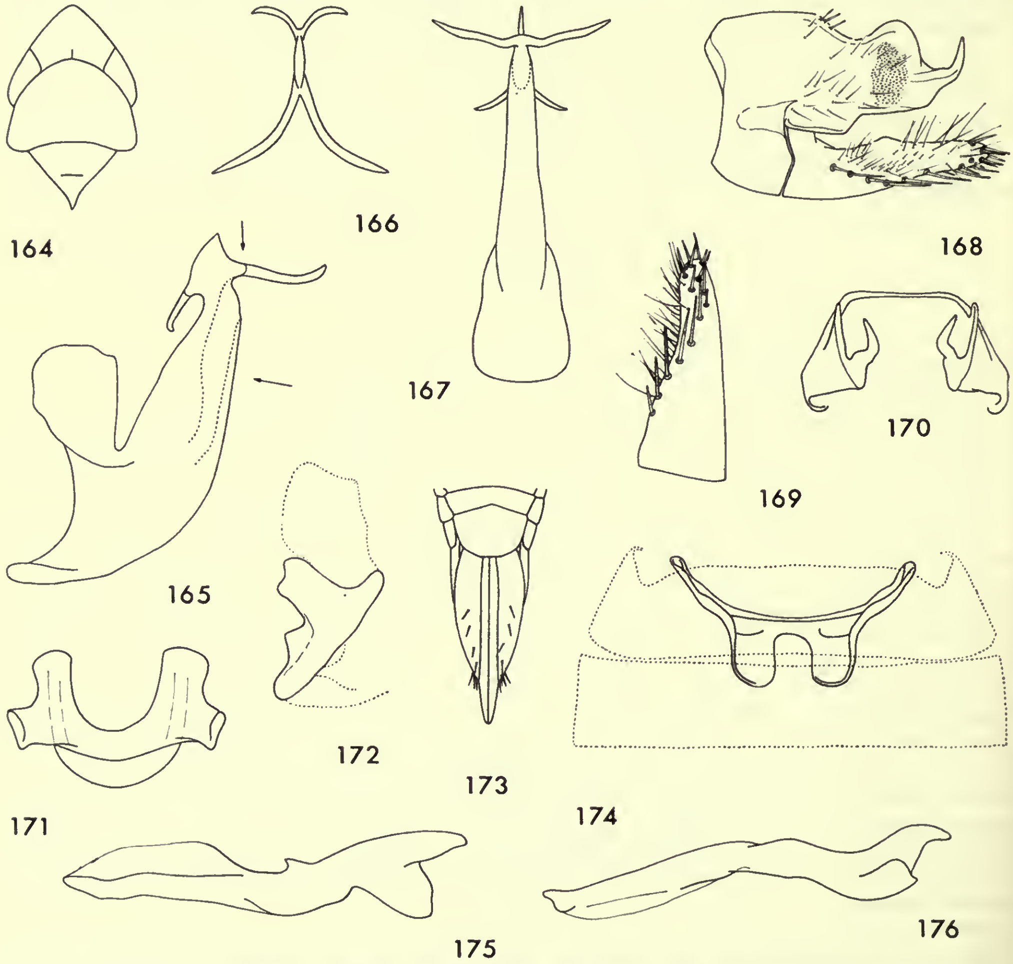
Male apodemes short, each with length subequal to width, extending to anterior region of fourth segment.

Male genitalia with pygofer as in *D. variata* Hardy. Subgenital plates with uniseriate row of spine-like setae along ventrolateral margin, becoming multiseriate apically and extending around apex, the basal half of series only slightly longer than distal half. Aedeagus with preatrium poorly developed, basal apodeme well developed, directed dorsally and expanding apically; shaft directed dorsally, robust, laterally compressed, tapering towards apex and terminating in a thin acute keel-like crest, with two pairs of subapical processes, a posterior pair diverging posterolaterally with their apices turned slightly dorsally and a much shorter and slightly more basad anterior pair diverging ventrolaterally; gonopore on posterior margin immediately basad of posterior subapical processes.

Female genitalia with sternum VII as in *D. variata* Hardy.

Distribution. Iowa (Ball & DeLong, 1925*a*; DeLong & Caldwell, 1937*a*), Minnesota (Medler, 1943*a*), Ohio (Johnson, 1935*a*), New Hampshire (Lowry, 1933*a*).

Specimens seen. CANADA: Ont., Maynooth, 1 ♀, 6.ix.1953 (*B. P. Beirne*); N. B., Fredericton, 1 ♀, 21.viii.1933 (*C. W. B. Maxwell*). UNITED STATES: Me., Orono, 1 ♀, 29.vii.13 (*H. Osborn*); Me., Orono, Maine Agr. Exp. Sta., 1 ♀, 31.vii.1918 (*H. Osborn*); Me., nr. Harpswell, 1 ♂, 12.viii.13 (*H. Osborn*); Me., Mt. Katahdin, 1,000′–1,500′, 1 ♂, 3 ♀, 22.viii.13 (*H. Osborn*); N. Y., Heart Lake, 1 ♂, 30.vii.1946



FIGS. 164–176. *Dikraneura urbana* Ball & DeLong. 164, head, pronotum and scutellum, dorsal view; 165, aedeagus, left lateral view; 166, apical processes of aedeagus, dorsal view in direction of arrow in fig. 165; 167, aedeagus, posterior view in direction of arrow in fig. 165; 168, male pygofer, valve and subgenital plate, left lateral view; 169, left subgenital plate, ventral view; 170, male pygofer, posterior view; 171, connective, anterodorsal view; 172, connective, left lateral view; 173, female genitalia, ventral view; 174, abdominal apodemes, dorsal view; 175, left style, dorsal view; 176, left style, left lateral view. Scale as in figs. 1–16.

(*R. H. Beamer*); N. Y., Fredonia, 1 ♂, 21.vii.46 (*R. H. Beamer*); Mass., Woods Hole, 1 ♀, 15.vii/6.viii.18 (*C. E. Olsen*); Conn., New Haven, 1 ♂, 20.viii.34 (*R. H. Beamer*); Pa., Hartstown B'g., 1 ♂, 5 ♀, 21.vi.21, 1 ♂, 14.ix.19, 1♀, 13.viii.19, 2 ♀, 12.ix.19 (*D. M. DeLong*), 1 ♀, 13.viii.19 (*Mrs. DeLong*), 1 ♀, 22.vi.21 (*T. L. Guyton*); Pa., Kane, 1 ♂, 22.viii.19, 1 ♀, 17.viii.20, 1 ♂, 1 ♀, 19.viii.20 (*D. M. DeLong*); Pa., Rockville, 1 ♂, 4 ♀, 7.vi.18 (*J. G. Sanders*); Pa., Loyalsock, 1 ♂, 22.viii.18 (*J. G. Sanders*); Pa., Greenfield, 1 ♂, 14.vii.22, 1 ♀, 22.viii.20 (*D. M. DeLong*); Pa., Speeceville, 1 ♂, 22.vii.17, 1 ♀, 14.vi.19 (*J. G. Sanders*); Pa., Laurel Run, 1 ♂, 31.v.18 (*J. G. Sanders*); Pa., Northeast, 1 ♂, 4 ♀, 24.vi.19, 2 ♀, 9.viii.19, 1 ♀, 2.vii.19 (*Mrs. DeLong*); Pa., Landisburg, 1 ♂, 3 ♀, 4.vii.18 (*J. G. Sanders*); Pa., Cresson, 2 ♀, 25.vii.18 (*J. N. Knull*); Pa., Waynesburg, 1 ♀, 17.vii.19 (*D. M. DeLong*); Pa., N. Bloomsfield, 1 ♀, 16.vii.20 (*J. G. Sanders*); Pa., Centre Co., Bear Meadows, 1 ♀, 22.viii.18 (*J. G. Sanders*); Pa., Tyrone, 1 ♀, 26.vii.17 (*J. G. Sanders*); Pa., Ohio Pl., 1 ♀, 18.vii.19 (*D. M. DeLong*); N. J., Singae, 1 ♂, 20.viii.16 (*no collector*); Md., Ocean City, 1 ♂, 18.vi.18 (*J. G. Sanders*); Md., Plummers Id., 1 ♂, 8.viii.43, 3 ♂, 2 ♀, 25.viii.43, 1 ♂, 4 ♀, 28.viii.43 (*R. H. Beamer*); D. C., Washington, 1 ♂, 25.x.06 (*J. G. Sanders*); Va., Arlington, 4 ♂, 1.viii.43, 6 ♂, 3 ♀, 12.ix.43 (*R. H. Beamer*); Va., Battle Pt., 1 ♀, 22.vi.18 (*J. G. Sanders*); Va., Cp. Charles, 1 ♀, 31.vii.20 (*D. M. DeLong*); Ohio, Akron, 2 ♂, 2 ♀, no date (*H. Osborn*); Ohio, Wooster, 1 ♂, no date (*H. Osborn*); Kentucky, Cadiz, 1 ♂, 30.vi.1938 (*R. H. Beamer*); Tenn., Clarksville, 1 ♂, 5.vii.1939 (*R. H. Beamer*); N. C., mountains, 1 ♂, 1937–1938 (*Z. P. Metcalf*); N. C., Raleigh, 1 ♀, v.09 (*Z. P. Metcalf*); N .C., Morrow Mtn. State Park, 1 ♂, 22.vii.59 (*F. W. Mead*).

New Records: Ontario, Maine, New Brunswick, New York, Connecticut, Pennsylvania, Massachusetts, New Jersey, Maryland, D.C., Virginia, Kentucky, Tennessee, N. Carolina.

Dikraneura urbana was originally described from 4 ♂, 4 ♀ from Ames, Iowa, of which only 3 ♀ (Exp. Sta. Ames, Ia., Jy. 21.97) located in the U.S.N.M. could be found. No further specimens of the type series could be found in the DeLong Collection. A lectotype was not selected.

Biology. *Dikraneura urbana* is active from spring to late summer. Although the earliest record is for July in New Hampshire (Lowry, 1933*a*) and Ohio (Johnson, 1935*a*), specimens at hand show it to be present as early as May in both Pennsylvania and North Carolina. The latest record is September in New Hampshire (Lowry, 1933*a*) and Ohio (Johnson, 1935*a*) as also for present specimens from Ontario, Pennsylvania and Virginia. Specimens at hand from D.C. however were taken in October. Lowry (1933*a*) records it as fairly common in moist meadows.

Remarks. *Dikraneura urbana*, described originally as a variety of *D. abnormis* (Walsh), may be distinguished externally from the latter species by its more acutely produced vertex and the absence of any marked indication of longitudinal vittae on the head and pronotum. It is similar in external appearance to *D. angustata* Ball & DeLong but is slightly longer and less slender than the latter and lacks the marked yellow longitudinal vittae on the head and pronotum. The male genitalia of all three species is highly diagnostic. On the basis of the male genitalia, *D. urbana* is most closely related to *D. abnormis* and *D. lacygnensis* sp. n. but may be distinguished from both these species by the shape of the aedeagus.

Dikraneura rubrala DeLong & Caldwell

(Text-figs. 177–193)

Dikraneura (*Notus*) *rubrala* DeLong & Caldwell, 1937*a* : 26.

Length: ♂ 3·32–3·52 mm. (mean 3·42 mm.). ♀ 3·20–3·60 mm. (mean 3·36 mm.).

Head with width equal to or slightly greater than that of pronotum, vertex angularly produced with apex narrowly rounded in dorsal aspect, medial length 1¾ times length next eyes, narrowly rounded to face with latter approximately as long as wide, ocellocular area equal in width to antennal fossa; pronotum with width increasing posteriorly or parallel-sided.

Colour of head pale brownish or sordid cream, paling laterally over genae, anteclypeus yellowish, vertex with a patch on each side of midline over posterior half reddish, midline pale creamish; eyes testaceous. Pronotum with disc reddish, anterior and lateral borders cream with area behind eyes marked with yellow, a patch anteriorly on each side of midline immediately posterior to those on vertex reddish or yellow; scutellum yellow; remainder of thorax dark brown marked laterally with pale yellow. Legs pale stramineous or yellowish cream. Fore wings with basal area subhyaline reddish with a streak along *Cu* whitish; apical half hyaline, faintly smoky brown, with veins reddish, paling to cream apically. Hing wings hyaline with veins dark brown. Abdomen with dorsum dark brown to black, lateral edges of posterior segments sometimes yellow, venter dark brown with anterior segments approaching black, lateral and posterior edges of sternites sometimes yellow; male pygofer, anal tube and valve light or dark brown, subgenital plates cream; female pygofer pale stramineous or creamish with dorsum and apex of ovipositor beyond pygofer brownish, sternum VII creamish.

Male apodemes short, each with length subequal to width, extending to anterior region of fourth segment.

Male genitalia with pygofer as in *D. variata* Hardy but without dorsal convexity at base of process. Aedeagus similar to *D. ossia* Beirne but with apical processes much shorter and wider, with apices mildly bifurcate and basal plate-like expansion wider and oriented at small yet variable angle to horizontal.

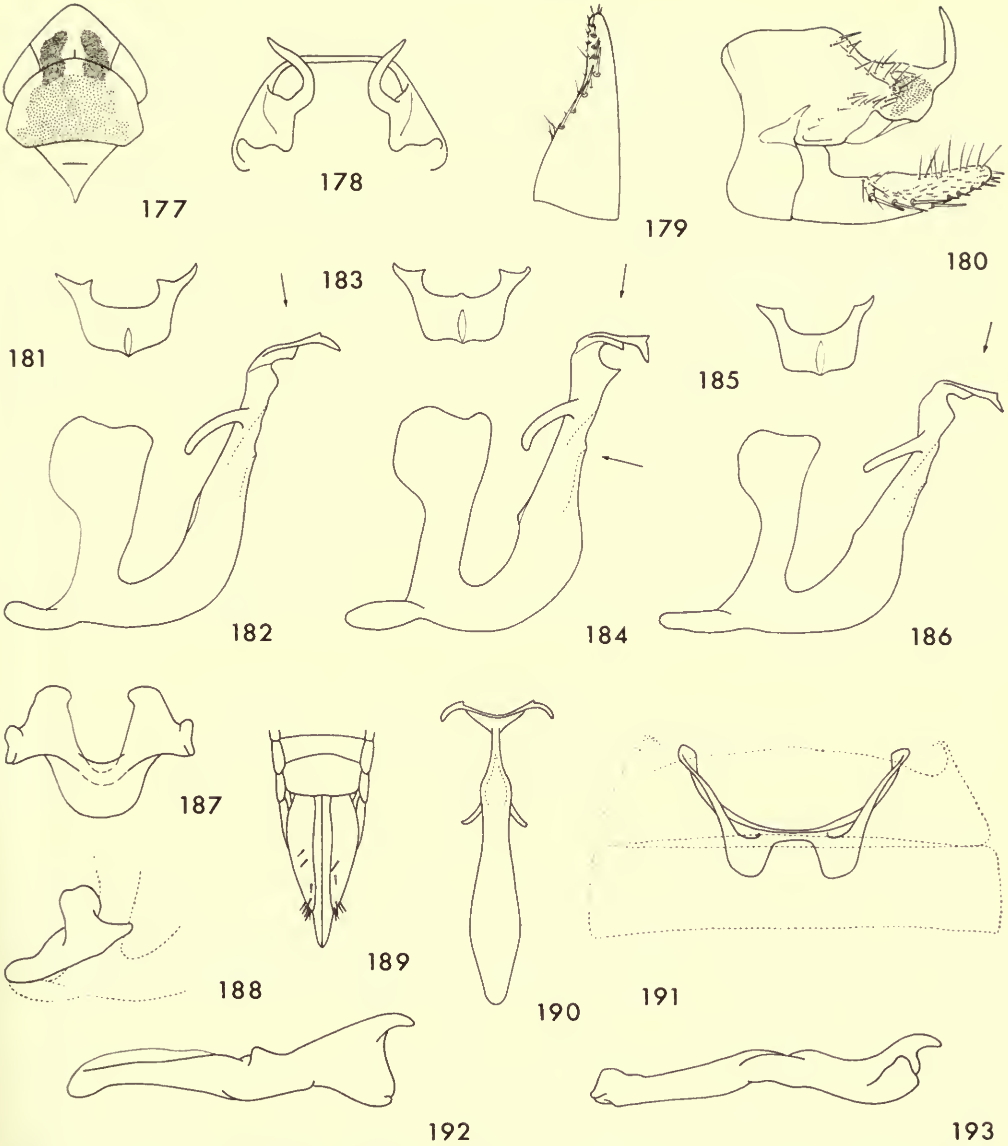
Female genitalia with lateral margins of sternum VII rounded to broadly convex posterior margin.

Distribution. Manitoba (Beirne, 1952*b*), Minnesota, Wisconsin (DeLong & Caldwell, 1937*a*).

Specimens seen. CANADA: Man., Mafeking, 3 ♂, 3.viii.37 (*R. H. Beamer*); Man., Aweme, 1 ♀, 27.v.30 (*R. M. White*); Man., Swan River, 1 ♂, 1 ♀, 2.viii.37 (*C. L. Johnston*); Ont., Maynooth, 1 ♂, 6.ix.1953 (*J. F. McAlpine*). UNITED STATES: Wis., Gillette, 1 ♂, 26.viii.37 (*R. H. Beamer*); Mich., Douglas Lake, 2 ♂, 22.viii.37 (*R. H. Beamer*); Mich., Lake Gogebic, 1 ♀, 18.viii.37 (*R. H. Beamer*); Me., Orono, 1 ♂, 5.viii.13 (*H. Osborn*).

New Records: Ontario, Michigan, Maine.

The holotype ♂, allotype ♀, 2 ♂, 3 ♀ paratypes (UNITED STATES: Minn., Taylor's Falls, 16.viii.16 (*D. M. DeLong*)) and 1 ♂ paratype (UNITED STATES: Wis., Bayfield, 10.ix.16 (*D. M. DeLong*)), all located in the DeLong Collection, Ohio State University, were studied. One paratype, also in the DeLong Collection, with the same data as the holotype, has its abdomen missing.



FIGS. 177–193. *Dikraneura rubrala* DeLong & Caldwell. 177, head, pronotum and scutellum, dorsal view; 178, male pygofer, posterior view; 179, left subgenital plate, ventral view; 180, male pygofer, valve and subgenital plate, left lateral view; 181, apical processes of aedeagus, dorsal view in direction of arrow in fig. 182; 182, aedeagus (Douglas Lake, Michigan), left lateral view; 183, apical processes of aedeagus, dorsal view in direction of arrow in fig. 184; 184, aedeagus (Douglas Lake, Michigan), left lateral view; 185, apical processes of aedeagus, dorsal view in direction of arrow in fig. 186; 186, aedeagus (Gillette, Wisconsin), left lateral view; 187, connective, antero-dorsal view; 188, connective, left lateral view; 189, female genitalia, ventral view; 190, aedeagus, posterior view in direction of arrow in fig. 184; 191, abdominal apodemes, dorsal view; 192, left style, dorsal view; 193, left style, left lateral view. Scale as in figs. 1–16.

Biology. *Dikraneura rubrala* has been previously recorded only during August in both Minnisota and Wisconsin (DeLong & Caldwell, 1937*a*). Specimens at hand indicate this month also for Manitoba, Michigan and Maine as well as Wisconsin. The remaining specimens were taken during May in Manitoba suggesting a longer period of activity than otherwise indicated.

Remarks. *Dikraneura rubrala* resembles *D. rufula* Gillette in general appearance and colour but with the vertex slightly less acutely angled in dorsal aspect. They may be readily distinguished by the male genitalia. It is also similar to *D. abnormis* (Walsh) but shorter, with the vertex less produced and less acute apically and with the disc of the pronotum red and without the distinct longitudinal vittae of *D. abnormis*. The reddish colouration of *D. rubrala* however is sometimes pale or occasionally absent with the patches on the vertex yellow, the disc of the pronotum pale brownish and the basal half of the fore wings pale greenish yellow.

On the basis of the male genitalia and abdominal apodemes, *D. rubrala* is most closely related to *D. ossia* Beirne. The aedeagus of both species is similar in the expansion of the apical processes into a flattened shield-like plate and the possession of lateral processes just basad of the apex. The shape of the apical plate and processes however is diagnostic for each species while the pygofer of *D. rubrala* lacks the dorsal convexity at the base of the posterior process. The colouration of the two species is also distinct.

Dikraneura arizona DeLong & Caldwell

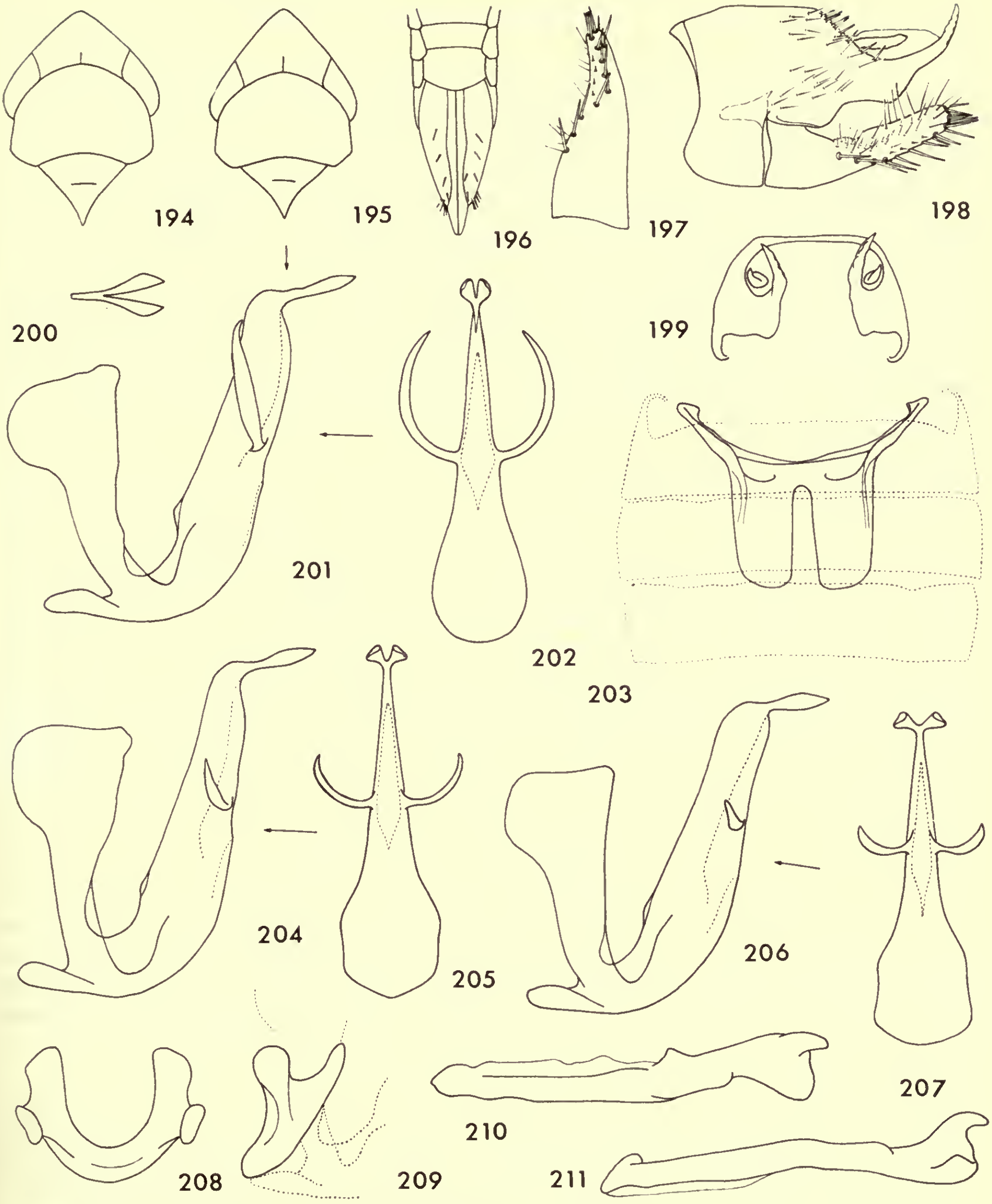
(Text-figs. 194–211)

Dikraneura (*Notus*) *arizona* DeLong & Caldwell, 1937*a* : 26.

Length: ♂ 3·30–3·92 mm. (mean 3·67 mm.). ♀ 3·62–4·28 mm. (mean 3·96 mm.).

Head with width greater than that of pronotum, rarely equal, vertex angularly produced with apex acutely rounded in dorsal aspect, rarely broadly so, sometimes more markedly produced and acutely angled in female, medial length $1\frac{3}{4}$–2 times length next eyes, narrowly rounded to face with latter as long as or slightly longer than wide, ocellocular area approximately $1\frac{1}{3}$ times width of antennal fossa; pronotum with width increasing only slightly posteriorly, often parallel-sided.

Colour of head sordid cream with midline of vertex slightly paler, apical areas of face and vertex washed with dark brown, the two patches tapering towards and meeting at extreme apex, marginal sutures orange or red with marginal area between them, and a small spot above antenna, cream; frontoclypeus washed with red; anteclypeus and lora yellowish; genae cream; eyes testaceous. Pronotum with disc pale brownish, reddish brown or pale sordid pinkish, anterior and lateral edges cream marked with yellow or pale orange; scutellum cream with basal angles and medial area yellow; remainder of thorax dark brown marked laterally with yellow. Legs pale stramineous. Fore wings with basal area subhyaline brownish or greenish yellow, often pale; apical half hyaline smoked with dark brown, veins yellowish paling to cream apically. Hind wings hyaline, veins dark brown. Abdomen with dorsum and venter black, latter sometimes dark brown over posterior half and occasionally over entire venter, sternites with posterior edge rarely yellow or white; male pygofer and anal tube dark brown, occasionally black, valve and subgenital plates concolorous cream, sometimes smoky, valve occasionally brown to dark brown; female pygofer cream with dorsum and apex of ovipositor beyond pygofer dark brown, sternum VII cream.



FIGS. 194–211. *Dikraneura arizona* DeLong & Caldwell. 194, head, pronotum and scutellum, dorsal view (male); 195, same (female); 196, female genitalia, ventral view; 197, left subgenital plate, ventral view; 198, male pygofer, valve and subgenital plate, left lateral aspect; 199, male pygofer, posterior view; 200, apical processes of aedeagus, dorsal view in direction of arrow in fig. 201; 201, aedeagus (Cloudcroft, New Mexico), left lateral view; 202, aedeagus, posterior view in direction of arrow in fig. 201; 203, abdominal apodemes, dorsal view; 204, aedeagus (Mexico City, Mexico), left lateral view; 205, aedeagus, posterior view in direction of arrow in fig. 204; 206, aedeagus (Vera Cruz, Mexico), left lateral view; 207, aedeagus, posterior view in direction of arrow in fig. 206; 208, connective, anterior view; 209, connective, left lateral view; 210, left style, dorsal view; 211, left style, left lateral view. Scale as in figs. 1–16.

Male apodemes elongate, each with length approximately twice width, extending to posterior end of fourth segment.

Male genitalia with pygofer tapering posteriorly in lateral aspect and terminating in a narrow finger-like process directed dorsoposteriorly then abruptly dorsolaterally, an elongate sclerite free within membrane dorsomesad of base of process; dorsolateral margin with a row of spine-like setae along medial sector; lateral surface with setae scattered over medial area. Subgenital plates with uniseriate row of spine-like setae along ventrolateral margin of uniform length, extending around apex. Aedeagus with preatrium short, basal apodeme well developed, directed dorsally and expanded apically; shaft directed dorsally, tapering towards apex and terminating in a pair of flattened, posteriorly directed processes, a pair of posterolateral processes near midlength, directed dorsally and of variable length, a pair of minute widely divergent obtusely angled triangular processes on anterior margin near base; gonopore on posterior margin, elongate along distal half of shaft.

Female genitalia with posterolateral angles of sternum VII broadly rounded, posterior margin broadly convex, sometimes mildly produced medially, rarely slightly concave medially.

Distribution. Colorado, Arizona (DeLong & Caldwell, 1937*a*), Mexico (Ruppel & DeLong, 1953*e*).

Specimens seen. UNITED STATES: S. D., Custer, 13 ♂, 26.viii.1935 (*M. W. Sanderson*); Cal., Guatay, 1 ♂, 3 ♀, 21.vii.41 (*E. L. Todd*); Nev., Austin, 2 ♂, 12.viii.40 (*D. E. Hardy*); Colo., Monument, 2 ♂, 18.viii.36 (*R. H. Beamer*); Colo., Durango, 2 ♂, 2.vii.37 (*R. H. Beamer*), 1 ♀, 2.vii.1937 (*L. D. Tuthill*); Colo., Estes Park, 1 ♂, 18.viii.29 (*D. A. Wilbur*); Colo., Glen Haven, 1 ♂, 1 ♀, 25.vii.1947, 1 ♀, 3.viii.1947 (*P. B. & E. R. Lawson*); Colo., Pinecliffe, 1 ♂, 9.vii.1949 (*R. H. Beamer*); Colo., Mesa Verde, 1 ♀, 3 .vii.1937 (*L. D. Tuthill*); Ariz., Santa Rita Mts., 1 ♂, 10.vii.1950 (*R. H. Beamer*); Ariz., Oak Creek, 1 ♂, 13.xii.39 (*Christenson*); N. M., Cloudcroft, 1 ♂, 14.vii.36, 13 ♂, 27.vi.40 (*R. H. Beamer*), 4 ♂, 8 ♀, 27.vi.1940 (*L. J. Lipovsky*), 6 ♂, 27.vi.40 (*D. E. Hardy*), 4 ♂, 3 ♀, 27.vi.1940 (*L. C. Kuitert*); N. M., Ruidoso, 1 ♂, 26.vi.40 (*R. H. Beamer*), 1 ♀, 26.vi.40 (*L. J. Lipovsky*), 2 ♀, 26.vi.1940 (*L. C. Kuitert*); N. M., Cowles, 2 ♂, 18.vii.36 (*R. H. Beamer*); N. M., Mountain Park, 1 ♂, 2 ♀, 27.vi.40 (*L. J. Lipovsky*); N. M., Shiprock, 1 ♂, 27.vii.38 (*D. J. & J. N. Knull*); N. M., Tajique, 1♂, 25.vi.41 (*L. H. Banker*), 1 ♂, 1 ♀, 25.vi.40 (*R. H. Beamer*), 1 ♀, 25.vi.40 (*D. E. Hardy*). MEXICO: Morelos, 10 km. N. Cuernavaca, 1 ♂, 28.xii.1949 (*J. G. Shaw*); 50 km. E. Mexico City, 1 ♂, 29.xii.1949 (*R. H. Beamer*); Hildago, Jacala, 1 ♂, 2.i.1950 (*J. G. Shaw*); Vera Cruz, 9 miles N.W. Jalapa, 1 ♂, 31.xii.1949 (*J. G. Shaw*), 1 ♂, 31.xii.1949 (*R. H. Beamer*), 16 ♂, 31.xii.1949 (*L. D. Beamer*); Chalpultepec, 1 ♀, no date, (*Koebele*).

New Records: South Dakota, California, Nevada, New Mexico.

The holotype ♂, allotype ♀ and 2 ♂ paratypes (UNITED STATES: Colo., El Paso Co., 19.vi.29 (*R. S. Martin*)), 1 ♂, 4 ♀ paratypes (UNITED STATES: Ariz., Santa Rita Mts., 12.vi.33 (*R. H. Beamer*)), 1 ♀ paratype (UNITED STATES: Ariz., Santa Rita Mts., 17.vii.32 (*R. H. Beamer*)), 1 ♀ paratype (UNITED STATES: Ariz., Chiricahua Mts., 8.vii.32 (*R. H. Beamer*)), 1 ♀ paratype (UNITED STATES: Ariz., Granite Dell, 30.vii.33 (*R. H. Beamer*)) and 1 ♀ paratype (UNITED STATES: Colo., Douglas Co., 27.vi.29 (*R. S. Martin*)), all located in the Snow Museum, University of Kansas, were studied. 1 ♂ paratype (UNITED STATES: Ariz., Santa Rita Mts., 17.vii.32 (*R. H. Beamer*)) and 1 ♀ paratype (UNITED STATES: Ariz., Huachuca Mts., 8.vii.32

(*R. H. Beamer*)), located in the DeLong Collection, Ohio State University, were also studied.

Biology. Records for *Dikraneura arizona* are limited to June and July in Arizona and June in Colorado (DeLong & Caldwell, 1937*a*). Of the specimens at hand, June in New Mexico is again the earliest it has been taken. The latest is December in Arizona and Mexico apart from one specimen taken in the latter locality in January. This species, together with other members of the genus in Mexico, is apparently restricted to the pine regions of the higher altitudes (Ruppel & DeLong, 1953*e*).

Remarks. Apart from slight differences in the direction of curvature of the pygofer processes, the individual variation of the male genitalia of *Dikraneura arizona* is negligible. A marked geographical variation is present, however, in the relative length of the lateral processes of the aedeagus. Throughout the United States, from South Dakota to New Mexico, California and Arizona, their length is constant and as illustrated in Text-figs. 201 and 202. Further south in Mexico there is a marked decrease in the length of these processes, the majority being as illustrated in Text-figs. 204 and 205 with one individual (Text-figs. 206 and 207) showing them still smaller. There is no external difference between the United States and Mexican specimens.

Dikraneura arizona is similar externally to *D. carneola* (Stål) but may be recognized by the generally sordid cream rather than yellowish colour of the head and by the dark brown smoky apical areas of the face and vertex. Although similar in male genitalia to *D. carneola* and related species, *D. arizona* is unique by the aedeagus having dorsally rather than anteriorly directed posterolateral processes and the presence at the base of the pygofer process of a distinct sclerite within the surrounding membrane.

Dikraneura triangulata **sp. n.**

(Text-figs. 212–223)

Length: ♂ 4·36–4·38 mm. (mean 4·37 mm.).

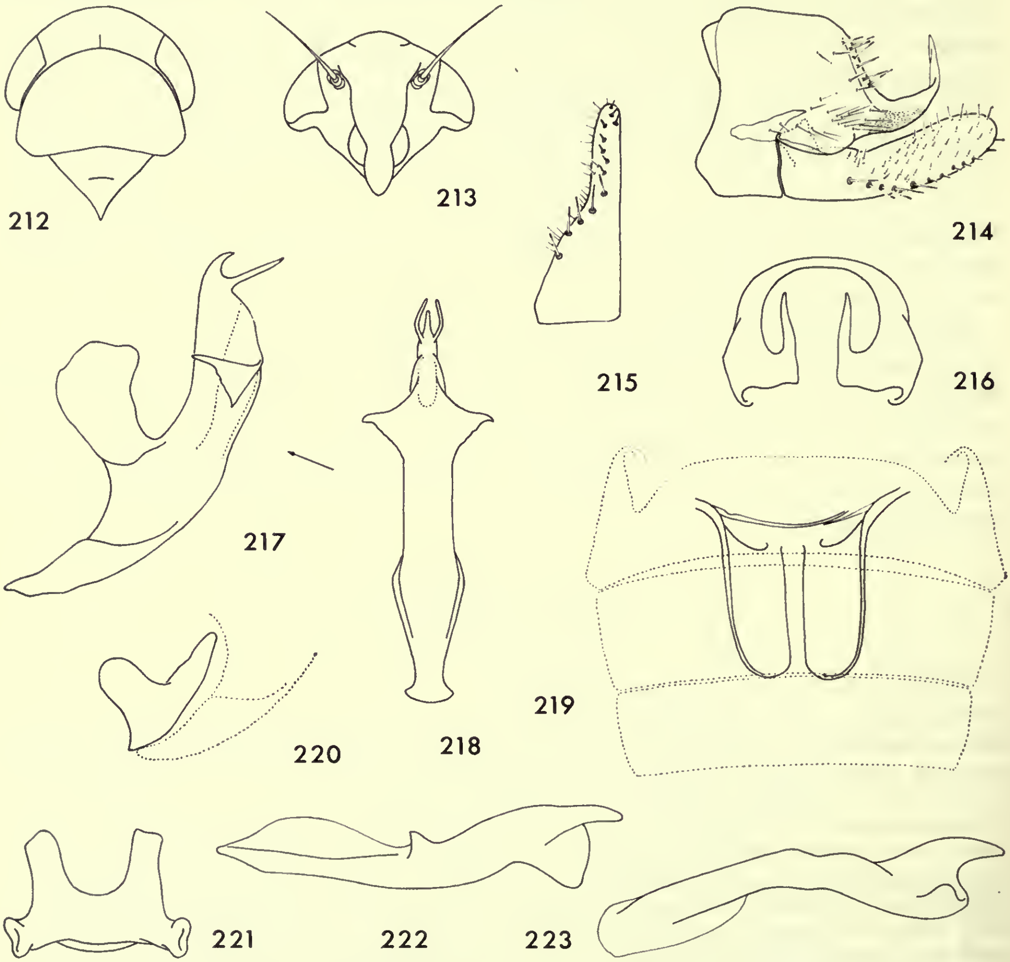
Head with width much greater than that of pronotum, vertex only slightly produced with anterior and posterior margins broadly rounded and approximately parallel, broadly rounded to face with latter wider than long, frontoclypeus slightly tumid, ocellocular area 1½ times width of antennal fossa; pronotum with width increasing posteriorly.

Colour of head light orange-brown, paling laterally over genae to cream, anteclypeus yellowish, facial sutures below antennae dark brown, marginal sutures orange, rim of small aperture approximately central on each gena dark brown; eyes testaceous. Pronotum dirty yellow, disc sordid or pale brownish; scutellum yellow; remainder of thorax dark brown marked laterally with yellow. Legs pale stramineous, sordid, washed at least basally with yellow. Fore wings with basal area subhyaline sordid yellow; apical half hyaline, faintly smoky brownish, veins creamish. Hind wings hyaline pale smoky brown, veins dark brown. Abdomen with dorsum black with lateral edges of posterior segments yellow, venter with anterior segments black, posterior segments dark brown, with lateral and posterior edges of sternites yellow or whitish yellow; male pygofer dark brown, anal tube black, valve dark brown, subgenital plates with basal area smoky yellow, apical area brown.

Male apodemes elongate, each with length approximately twice width, extending to posterior margin of fourth segment.

Male genitalia with pygofer as in *D. latacephala* Beamer but with posterior processes straight and directed dorsally and with a group of microspines posterior to lateral setae and immediately basad of process. Subgenital plates much thicker laterally than usual. Aedeagus with preatrium and dorsally directed basal apodeme well developed; shaft curving dorsally from preatrium, robust, tapering towards apex and terminating in a laterally compressed, acute, posteriorly curved, medial crest; a pair of narrow posteriorly directed elongate processes on posterior margin immediately basad of apex; a pair of broadly triangular, posterolateral processes immediately distad of midlength, directed anterolaterally; gonopore on posterior margin, immediately distad of posterolateral processes.

Female unknown.



FIGS. 212–223. *Dikraneura triangulata* sp. n. 212, head, pronotum and scutellum, dorsal view; 213, face; 214, male pygofer, valve and subgenital plate, left lateral view; 215, left subgenital plate, ventral view; 216, male pygofer, posterior view; 217, aedeagus, left lateral view; 218, aedeagus, posterior view in direction of arrow in fig. 217; 219, abdominal apodemes, dorsal view; 220, connective, left lateral view; 221, connective, anterodorsal view; 222, left style, dorsal view; 223, left style, left lateral view. Scale as in figs. 1–16.

Holotype ♂. Mexico: D. F., La Guarda, K 40, 26.x.41 (*DeLong, Good, Caldwell & Plummer*), in the U.S. National Museum.

Paratype. 1 ♂, same data as holotype, in the U.S. National Museum.

Biology. *Dikraneura triangulata* is known only from the holotype and paratype taken in Mexico during October.

Remarks. In general appearance, *Dikraneura triangulata* is similar to *D. robusta* Lawson in its more or less unproduced vertex and short wide face with the frontoclypeus slightly tumid and the ocellocular area much wider than the antennal fossa. These characters are unique within the genus and are shown to a lesser degree by only one other species, *D. latacephala* Beamer. *D. triangulata* however is much larger than *D. robusta* and differs greatly in the male genitalia. It is perhaps most closely related to *D. ungulata* Beamer and *D. latacephala* in the ventroposterior origin of the pygofer processes and the absence of a dorsal convexity at their base although is characterized by the processes being straight and directed dorsally rather than recurved. The aedeagus of *D. triangulata* is unique within the genus in its triangular rather than elongate posterior processes and the medial crest at its apex, the latter being found also in only *D. urbana* Ball & DeLong.

Dikraneura latacephala Beamer

(Text-figs. 224–236)

Dikraneura latacephala Beamer, 1943*b* : 57.

Length: ♂ 3·50–3·64 mm. (mean 3·54 mm.). ♀ 3·64–4·40 mm. (mean 3·90 mm.).

Head with width greater than that of pronotum, vertex moderately produced with apex broadly rounded in dorsal aspect, medial length $1\frac{1}{2}$–$1\frac{3}{4}$ times length next eyes, slightly more produced in female, broadly rounded to face with latter slightly wider than long, frontoclypeus slightly tumid, ocellocular area $1\frac{1}{3}$ times width of antennal fossa; pronotum with width increasing only slightly posteriorly or parallel-sided.

Colour of head cream or pale brownish, paling laterally over genae; eyes testaceous. Pronotum cream, disc faintly sordid; scutellum pale yellowish cream; remainder of thorax with dorsum dark brown, venter pale stramineous. Legs pale stramineous. Fore wings with basal area whitish subopaque becoming hyaline apically, veins whitish. Hind wings hyaline, veins whitish. Abdomen with dorsum dark brown with lateral edges pale yellow or cream, venter pale yellow; male pygofer and anal tube dark brown, former paling ventrolaterally to cream, valve and subgenital plates concolorous cream; female pygofer cream with dorsum and apex of ovipositor beyond pygofer dark brownish, sternum VII cream.

Male apodemes elongate, each with length approximately twice width, extending to posterior end of fourth segment.

Male genitalia[4] with pygofer tapering abruptly posteriorly in lateral aspect and terminating in a narrow finger-like process directed posterodorsally with apex turned dorsolaterally; dorsolateral margin with a row of spine-like setae along vertically inclined sector immediately distad of midlength; lateral surface with hair-like setae over posterior half. Subgenital plates with uniseriate row of spine-like setae along ventrolateral margin of uniform length. Aedeagus with preatrium well developed, basal apodeme directed dorsally; shaft directed dorsally, tapering towards apex and terminating in a pair of large laterally compressed posteriorly directed processes, their apices turned slightly mesad; posterior margin produced approximately one-third distance from apex as an elongate posterodorsally directed medial spine; a pair of short posterior processes immediately basad of posterior spine, directed laterally and then anteriorly; gonopore on posterior margin at base of medial spine, between latter and posterior processes.

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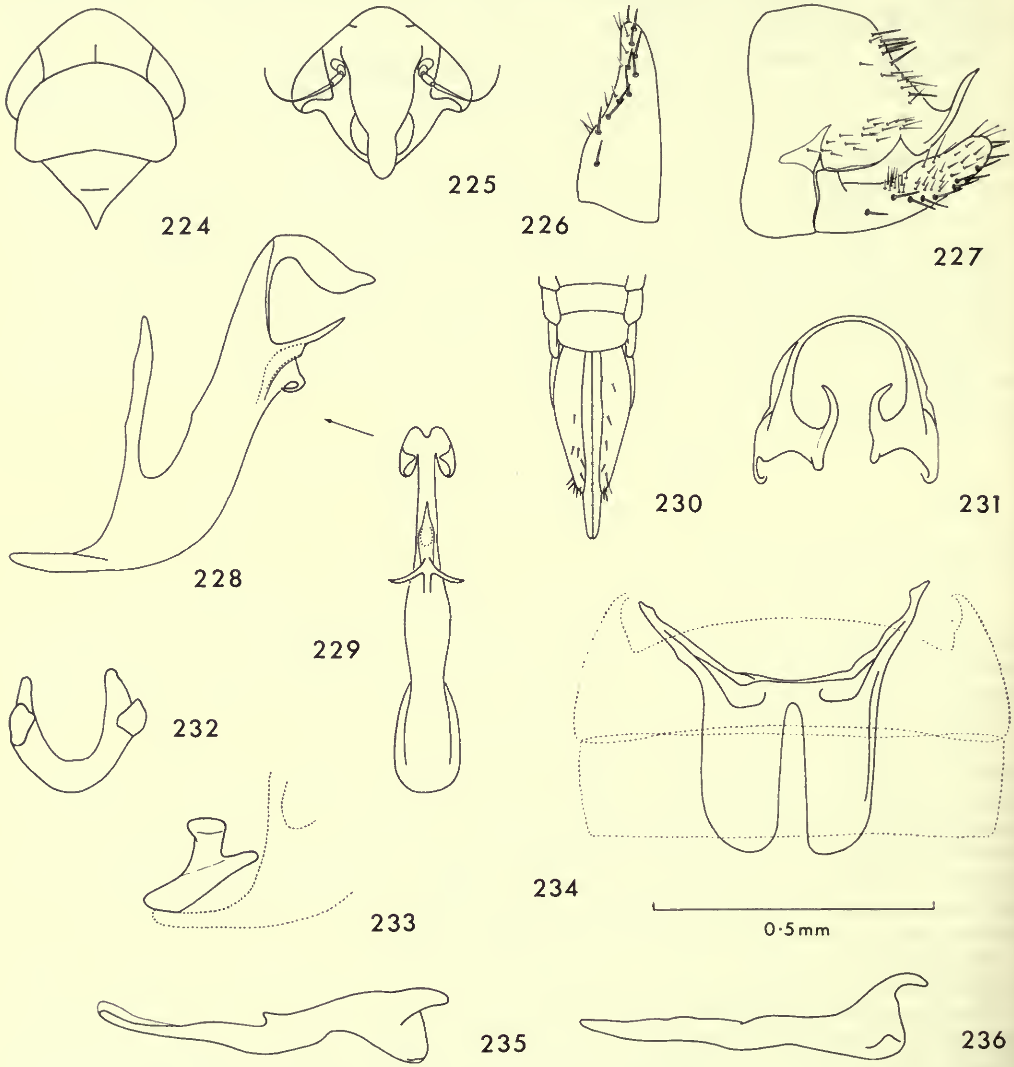
[4] Pygofer, subgenital plates, and connective in available specimens poorly sclerotized and partially membranous, typical of parasitized specimens. The shaft of the aedeagus, the styles and the abdominal apodemes, however, are well sclerotized and normal.

Female genitalia with posterolateral angles of sternum VII broadly rounded, posterior margin broadly convex, sometimes mildly produced medially.



Figs. 224–236. *Dikraneura latacephala* Beamer. 224, head, pronotum and scutellum, dorsal view; 225, face; 226, left subgenital plate, ventral view; 227, male pygofer, valve and subgenital plates, left lateral view; 228, aedeagus, left lateral view; 229, aedeagus, posterior view in direction of arrow in fig. 228; 230, female genitalia, ventral view; 231, male pygofer, posterior view; 232, connective, anterodorsal view; 233, connective, left lateral view; 234, abdominal apodemes, dorsal view; 235, left style, dorsal view; 236, left style, left lateral view. Scale of fig. 234 as shown, rest as in figs. 1–16.

Distribution. Colorado (Beamer, 1943*b*).

Specimens seen. UNITED STATES: Colo., Pagosa Springs, 5 ♀, 5.vii.1937 (*L. D. Tuthill*); Colo., Durango, 1 ♀, 2.vii.1937 (*L. D. Tuthill*); Colo., Creede, 2 ♀, 6.vii.1937, 1 ♀, 24.vi.1936, 2 ♀, 28.vi.1937 (*L. D. Tuthill*); Colo., Spring Cr. Pass, 4 ♀, 29.vi.1937 (*L. D. Tuthill*).

The holotype ♂, allotype ♀ and 14 ♀ paratypes (UNITED STATES: Colo., Creede, 6.vii.1937 (*R. H. Beamer*)) and 1 ♂, 7 ♀ paratypes (UNITED STATES: Colo., Pagosa Springs, 5.vii.1937 (*R. H. Beamer*)), located in the Snow Museum, University of Kansas, were studied. One paratype (UNITED STATES: Colo., Pagosa Springs, 5.vii.1937 (*R. H. Beamer*)), also located in the Snow Museum, has its abdomen missing.

Biology. Apparently restricted to Colorado, *Dikraneura latacephala* has been recorded during July (Beamer, 1943*b*). Specimens at hand show it to be active in the state during both June and July.

Remarks. *Dikraneura latacephala* is similar to *D. robusta* Lawson and to a lesser extent *D. triangulata* sp. n., in the shape of the head although it is readily distinguished from either of these species by means of the male genitalia. The male pygofer and the abdominal apodemes of *D. latacephala* resemble those of *D. ungulata* Beamer and *D. triangulata* while the aedeagus resembles that of *D. ungulata*, as well as *D. rufula* Gillette and *D. retusa* Beamer, in the elongate spine on the posterior margin.

Dikraneura ungulata Beamer

(Text-figs. 237–242)

Dikraneura ungulata Beamer, 1943*b* : 55.

Length: ♂ 4·20 mm. ♀ 4·30–4·40 mm. (mean 4·35 mm.).

Head with width slightly greater than that of pronotum, vertex angularly produced with medial length twice length next eyes, apex acutely rounded in dorsal aspect; pronotum with width increasing slightly posteriorly.

Colour of head pale yellow, paling laterally over genae to whitish, frontoclypeus and anterior area of vertex faintly smoked brownish or reddish. Pronotum pale yellow, disc whitish or faintly reddish; scutellum pale yellow; remainder of thorax pale yellow, in parts brownish. Legs pale stramineous. Fore wings with basal area colourless opaque or pale reddish; apical half hyaline. Abdomen dark brown to black; female pygofer stramineous with dorsum and apex of ovipositor beyond pygofer dark brown, sternum VII pale stramineous. (Colour of male genital capsule not obtainable).

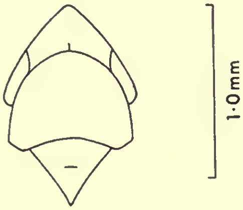
Male apodemes elongate, length of each twice width, extending to near midlength of fifth segment.

Male genitalia with pygofer and subgenital plates as in *D. latacephala* Beamer but with posterior processes directed dorsomesally and then abruptly dorsolaterally near midlength. Aedeagus with preatrium short; basal apodeme elongate, laterally compressed, directed dorsally and expanding at apex in lateral aspect; shaft elongate, directed dorsally, tapering gradually towards apex, the latter turned posteriorly and terminating in a pair of elongate posteroventrally directed processes, their apices turned mesad and crossed, posterior margin of shaft produced approximately one-fifth distance from apex as an elongate dorsoposteriorly directed spine-like process terminating just short of apical processes; a pair of very short lateral processes near base of shaft, directed laterally and then anteriorly; gonopore on posterior margin immediately basad of posterior spine.

Female genitalia as in *D. urbana* Ball & DeLong with posterolateral angles of sternum VII broadly rounded, posterior margin transverse.

Distribution. Arizona (Beamer, 1943*b*).

Specimens seen. Holotype ♂, UNITED STATES: Ariz., Santa Rita Mts., 18.viii.35 (*E. I. Beamer*); allotype ♀ and 1 ♀ paratype, UNITED STATES: Ariz., Santa Rita Mts., 18.viii.35 (*R. H. Beamer*), all in the Snow Museum, University of Kansas.



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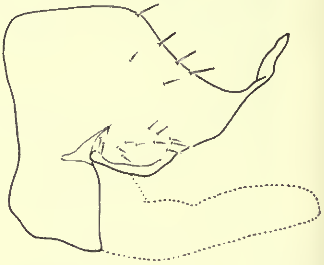

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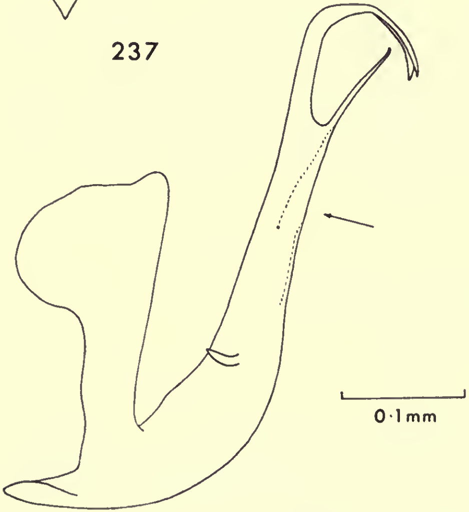

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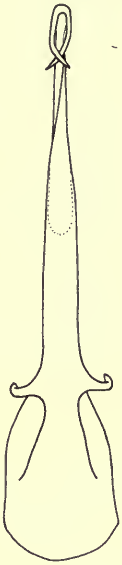

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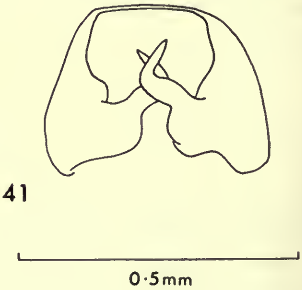

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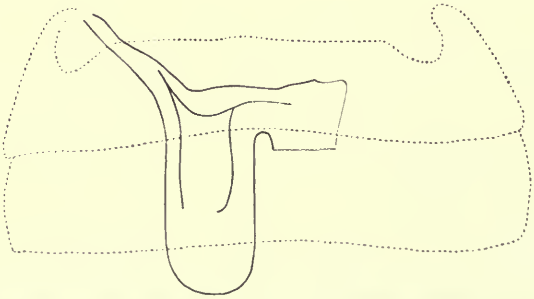

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FIGS. 237–242. *Dikraneura ungulata* Beamer. 237, head, pronotum and scutellum, dorsal view; 238, male pygofer and valve, left lateral view; 239, aedeagus, left lateral view; 240, aedeagus, posterior view in direction of arrow in fig. 239; 241, male pygofer, posterior view; 242, abdominal apodemes, dorsal view. Scale as shown with male pygofer and abdominal apodemes to same scale.

Biology. *Dikraneura ungulata* has been recorded only once, during August in Arizona (Beamer, 1943*b*), and its biology is unknown.

Remarks. *Dikraneura ungulata* is closely related to *D. rufula* Gillette in the shape of the aedeagus although it differs greatly in the shape of the pygofer which is more similar to that of *D. latacephala* Beamer. It resembles the former of these species in the general shape of the head but lacks its well developed red colouration.

Dikraneura retusa Beamer

(Text-figs. 243–256)

Dikraneura retusa Beamer, 1943*b* : 55.

Length: ♂ 3·20–3·50 mm. (mean 3·33 mm.). ♀ 3·50 mm.

Head with width greater than that of pronotum, vertex moderately produced with apex broadly rounded in dorsal aspect, medial length 1½ times length next eyes, broadly rounded to face with latter approximately as long as wide, ocellocular area equal in width to antennal fossa; pronotum with width increasing only slightly posteriorly, or parallel-sided.

Colour of head pale brownish or sordid cream, paling laterally on genae, vertex washed with yellow; eyes testaceous. Pronotum yellow marked laterally and often medially at anterior border with cream, disc sordid or pale brownish, often pink; scutellum yellow; remainder of thorax dark brown marked laterally with yellow. Legs pale stramineous. Fore wings with basal area subhyaline greenish yellow, often faintly so, often pink; apical half hyaline, pale smoky brown, veins creamish. Hind wings hyaline with veins dark brown. Abdomen with dorsum dark brown to black, lateral edge yellow, venter dark brown to black, sternites with lateral and posterior edges yellow; male pygofer and anal tube dark brown, valve dark brown, subgenital plates light brown; female pygofer yellowish cream with dorsum and apex of ovipositor beyond pygofer dark brown, sternum VII yellowish cream.

Male apodemes each with length approximately 1½ times width, extending to near posterior margin of fourth segment.

Male genitalia as in *D. rufula* Gillette but with microspines on pygofer rarely present and with aedeagus more elongate, apical processes directed more dorsoposteriorly, lateral processes relatively larger and arising posterolaterally immediately basad of gonopore and anterior processes reduced.

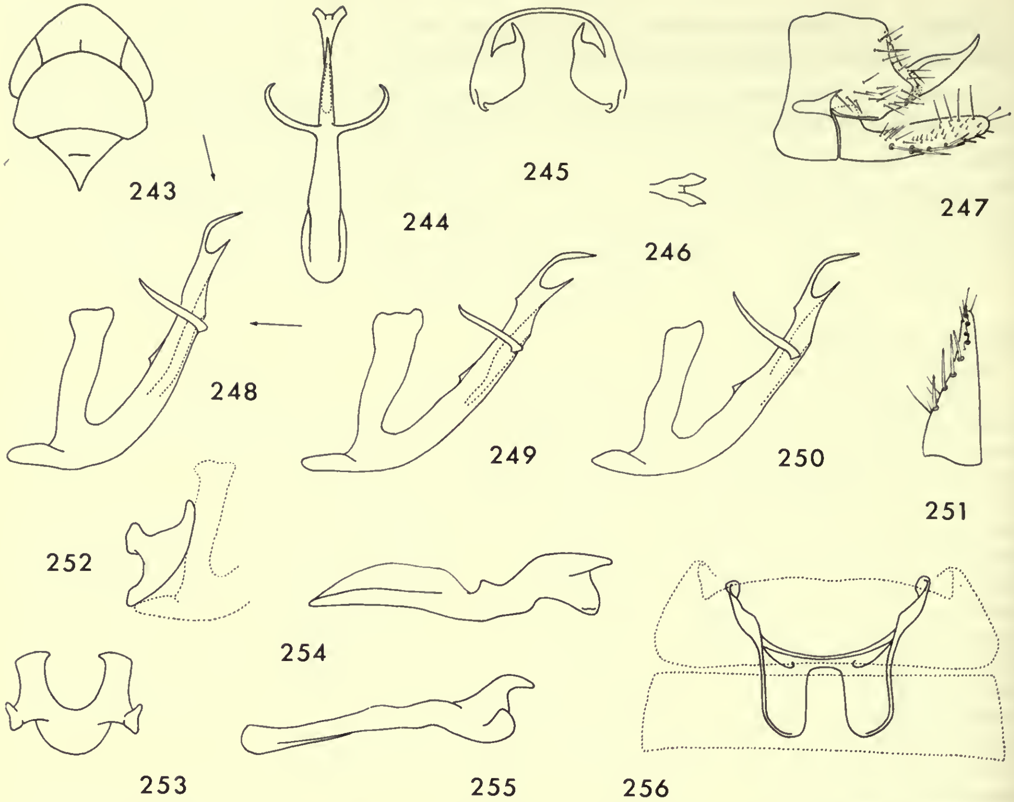
Female genitalia with sternum VII as in *D. omani* sp. n.

Distribution. California (Beamer, 1943*b*).

Specimens seen. UNITED STATES: Cal., Golden Gate, 4 ♂, 17.vii.33 (*R. H. Beamer*); Cal., Monterey, 1 ♂, 22.vii.35 (*R. H. Beamer*); Cal., Santa Rosa, 1 ♂, 16.viii.38 (*R. H. Beamer*); Cal., Berkeley, 1 ♂, ix.1914 (*H. H. P. Severin*).

Holotype ♂, allotype ♀, 1 ♂ paratype (UNITED STATES: Cal., Stinson Beach, 15.viii.38 (*R. H. Beamer*)), 12 ♂ paratypes (UNITED STATES: Cal., Monterey, 22.vii.35 (*R. H. Beamer*)), 1 ♂ paratype (UNITED STATES: Cal., Monterey, 22.vii.35 (*J. Beamer*)), 2 ♂ paratypes (UNITED STATES: Cal., Monterey, 22.vii.35 (*E. I. Beamer*)), 1 ♂ paratype (UNITED STATES: Cal., Monterey, 22.vii.35 (*J. Russell*)), 3 ♂ paratypes (UNITED STATES: Cal., Mt. Tamalpais, 15.viii.38 (*R. H. Beamer*)) and 1 ♂ paratype (UNITED STATES: Cal., Sargent, 22.vii.35 (*R. H. Beamer*)), located in the Snow Museum, University of Kansas, were also studied.

4 ♂ paratypes (UNITED STATES: Cal., Monterey, 10.viii.38 (*R. H. Beamer*)) and 4 ♂ paratypes (UNITED STATES: Cal., Monterey, 22.vii.35 (*R. H. Beamer*)), also located in the Snow Museum, are *D. rufula* Gillette.



FIGS. 243–256. *Dikraneura retusa* Beamer. 243, head, pronotum and scutellum, dorsal view; 244, aedeagus, posterior view in direction of arrow in fig. 248; 245, male pygofer, posterior view; 246, apical processes of aedeagus, dorsal view in direction of arrow in fig. 248; 247, male pygofer, valve and subgenital plate, left lateral view; 248, aedeagus (Monterey, California), left lateral view; 249, same (Golden Gate, California); 250, same (Berkeley, California); 251, left subgenital plate, ventral view; 252, connective, left lateral view; 253, connective, anterior view; 254, left style, dorsal view; 255, left style, left lateral view; 256, abdominal apodemes, dorsal view. Scale as in figs. 1–16.

Biology. *Dikraneura retusa*, found only in the San Francisco-Monterey area of California, has been recorded during July and August (Beamer, 1943*b*). Specimens at hand show it to be present also during September.

Remarks. As far as at present known, *Dikraneura retusa* has a very restricted distribution. Its relationship to the closely related and more widely dispersed species *D. rufula* Gillette is discussed under the latter.

Dikraneura rufula Gillette

(Text-figs. 257–276)

Dicraneura abnormis var. *rufula* Gillette, 1898*a* : 720.
Dikraneura rufula Gillette; Ball & DeLong, 1925*a* : 329.

Length: ♂ 3·32–3·76 mm. (mean 3·54 mm.). ♀ 3·44–3·88 mm. (mean 3·75 mm.).

Head with width equal to or slightly greater than that of pronotum, vertex angularly produced with apex acutely rounded in dorsal aspect, medial length approximately twice length next eyes, narrowly rounded to face with latter as long as or slightly longer than wide, ocellocular area equal in width to antennal fossa; pronotum with width increasing only slightly posteriorly.

Colour of head pale brownish or sordid cream, paling over vertex and laterally over genae, a small patch on face above antenna whitish, sometimes indistinct, vertex with a patch on each side of midline over posterior half reddish or orange; eyes testaceous. Pronotum with disc pinkish or reddish, anterior and lateral edges cream marked with yellow or pale orange, a patch at anterior margin on each side of midline immediately posterior to those on vertex reddish, orange, or yellow, sometimes indistinct; scutellum cream or yellow with basal angles and medial area in parts reddish orange; remainder of thorax dark brown marked laterally with cream or yellow. Legs pale stramineous. Fore wings with basal half subhyaline reddish; apical half hyaline, pale smoky brown, veins red. Hind wings hyaline with veins dark brown. Abdomen with dorsum dark brown to black with lateral edges of posterior, and occasionally all, segments yellow, venter dark brown to black, sternites with posterior and lateral edges usually cream or yellow; male pygofer and anal tube dark brown, valve brown, subgenital plates cream or brownish cream; female pygofer stramineous with dorsum and ovipositor beyond pygofer dark brown, sternum VII pale stramineous. Colour pattern rarely devoid of red with disc of pronotum sordid, patches on vertex yellowish and basal area of fore wings greenish yellow.

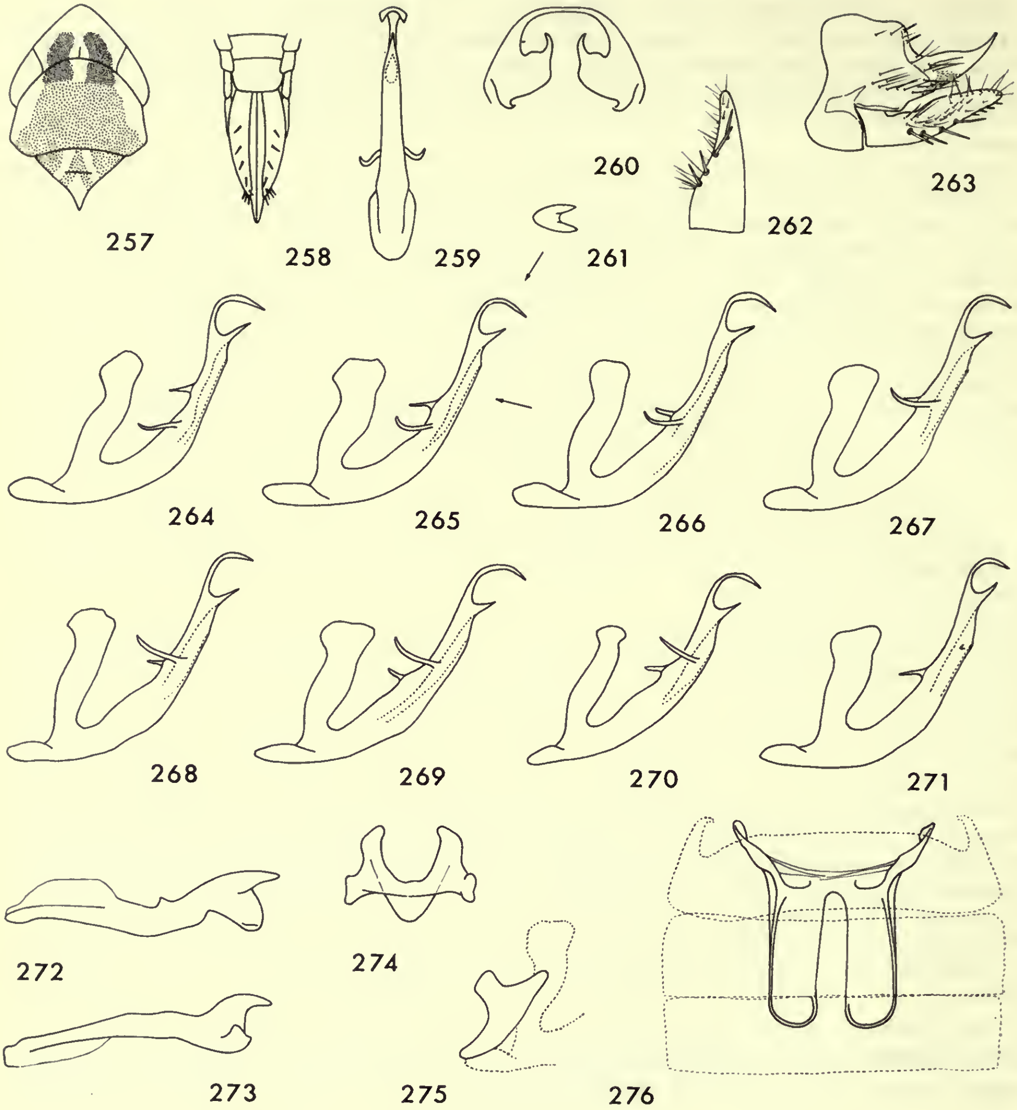
Male apodemes elongate, each with length approximately 3 times width, extending to near midlength of fifth segment.

Male genitalia with pygofer tapering abruptly posteriorly to an elongate dorsoposteriorly directed lobe, the latter terminating in a short peg-like process directed dorsolaterally and posteriorly; lateral surface with numerous setae scattered over posterior half to base of posterior lobe with a small group of microspines ventrolaterally immediately posterior to setae. Aedeagus with preatrium moderately developed; dorsally directed basal apodeme well developed; shaft elongate, directed dorsoposteriorly, tapering towards apex with latter curving posteriorly and terminating in a pair of short robust processes directed ventroposteriorly, an acute medial spine on posterior surface immediately basad of apical processes and directed dorsoposteriorly, the apex in lateral aspect appearing deeply emarginate posteriorly; a pair of elongate lateral processes near midlength of shaft but variable in origin along its length, directed anteriorly and diverging laterally, their apices turned dorsad; a pair of shorter divergent dagger-like processes on anterior margin near midlength directed anteriorly; gonopore on posterior margin immediately basad of medial spine.

Female genitalia with lateral margins of sternum VII broadly rounded to transverse posterior margin.

Distribution. British Columbia (Beirne, 1952*b*), Quebec (Moore, 1950*a*), California (Gillette, 1898*a*; Ball & DeLong, 1925*a*; Lawson, 1930*e*; DeLong & Caldwell, 1937*a*; Beamer, 1943*b*), Utah (Lawson, 1930*e*).

Specimens seen. UNITED STATES: Wash., Du Pont, 3 ♂, 5.vii.35 (*R. H. Beamer*); Ore., Yoncalla, 1 ♂, 12.vii.35 (*R. H. Beamer*); Cal., Giant Forest, 6 ♂, 28.vii.29 (*R. H. Beamer*); Cal., Marin Co., 2 ♂, 3.viii.29 (*R. H. Beamer*); Cal., Stinson Beach, 2 ♂, 15.viii.38 (*R. H. Beamer*); Cal., Tulare Co., 27 ♂, 29.vii.29 (*R. H. Beamer*); Cal., Tulare Co., Wood L., 1 ♂, 3.xi.1947 (*N. W. Frazier*); Cal., Sequoia Nat. Pk., 1 ♂, 1 ♀, 6.40.viii (*R. H. Beamer*), 1 ♂, 6.viii.1940 (*L. J. Lipovsky*), 4 ♂, 3 ♀, 6.viii.1940 (*D. E. Hardy*); Cal., Yosemite Pk., 6 ♂, 10.viii.30 (*no collector*); Cal., Yosemite N. Pk., 1 ♂, 1.viii.1940 (*L. J. Lipovsky*); Cal., Yosemite Valley, 2 ♂, 10.vii.33 (*R. H. Beamer*); Cal., Gen. Grant Pk., 5 ♀, 12.viii.30 (*no collector*); Cal., Ventura, 1 ♂, 20.vii.33 (*R. H. Beamer*); Cal., Lafayette, 1 ♂, 14.vii.33 (*R. H.*



FIGS. 257–276. *Dikraneura rufula* Gillette. 257, head, pronotum and scutellum, dorsal view; 258, female genitalia, ventral view; 259, aedeagus, posterior view in direction of arrow in fig. 265; 260, male pygofer, posterior view; 261, apical processes of aedeagus, dorsal view in direction of arrow in fig. 265; 262, left subgenital plate, ventral view; 263, male pygofer, valve and subgenital plate, left lateral view; 264, aedeagus (Tulare Co., California), left lateral view; 265, same (Tulare Co., California); 266, same (Tulare Co., California); 267, same (Monterey, California); 268, same (Monterey, California); 269, same (Monterey, California); 270, same (Marin Co., California); 271, same (Cuyamaca Lake, California); 272, left style, dorsal view; 273, left style, left lateral view; 274, connective, anterodorsal view; 275, connective, left lateral view; 276, abdominal apodemes, dorsal view. Scale as in figs. 1–16.

Beamer); Cal., Garberville, 1 ♂, 15.vii.35 (*R. H. Beamer*); Cal., Fresno Co., 1 ♀, vii.1919 (*F. E. Blaisdell*); Cal., Leona Heights, 1 ♂, 15.vii.33 (*R. H. Beamer*); Cal., Tuolumne Co., Strawberry, 1 ♂, 22.viii.60 (*E. Jessen*); Cal., Strawberry, 1 ♂, 8.viii.29 (*L. D. Anderson*); Cal., Healdsburg, 2 ♀, 22.x.1941 (*Cook & York*); Cal., Cuyamaca Lake, 2 ♂, 6.vii.29 (*R. H. Beamer*); Cal., Monterey, 8 ♂, 10.viii.38 (*R. H. Beamer*).

New Records: Washington, Oregon.

The ♂ neotype (UNITED STATES: Cal., Dunsmuir, 29.vi.35 (*R. H. Beamer*)), designated by Beamer (1943*b*) and located in the Snow Museum, University of Kansas, was also studied. As stated under *D. retusa* Beamer, eight paratypes of the latter species (UNITED STATES: Cal., Monterey, 4 ♂, 10.viii.38 (*R. H. Beamer*); Cal., Monterey, 4 ♂, 22.vii.35 (*R. H. Beamer*)), also located in the Snow Museum, are in fact *D. rufula*.

Biology. *Dikraneura rufula* has been previously recorded during June in California (Beamer, 1943*b*). Specimens at hand were taken during July in Washington, Oregon and California and as late as November in the latter state.

Remarks. *Dikraneura rufula* may be distinguished externally from the closely related species *D. retusa* Beamer by its more produced and acutely rounded vertex, by the head and pronotum being more or less of equal width and by its distinct reddish colouration. It may be further distinguished from *D. retusa* by the longer male apodemes, the longer and more acute anterior processes of the aedeagus, the smaller size and location of the lateral processes of the aedeagus and to a lesser extent by the shape and degree of curvature of the paired apical processes and by the presence of microspines on the posterior lobe of the pygofer. Some individual variation occurs in the point of origin of the lateral processes of the aedeagus relative to the anterior ones (Text-figs. 264–271), Text-fig. 265 however being the most prevalent form throughout the entire geographical range.

The population at Monterey, California (Text-figs. 267–269) is of particular interest since the variation of the lateral processes approaches in some specimens the condition found in *D. retusa* Beamer. In all other respects they are identical to *D. rufula* although paler in colour with a marked decrease in pigmentation towards the posterior end of the abdomen. The vertex is strongly produced as usual but is sometimes bluntly rounded apically rather than acutely so, while the head itself is in many cases markedly wider than the pronotum, similar to that of *D. retusa*. They are also slightly smaller in size than usual. The specimens from this locality were originally designated as paratypes of *D. retusa*. In addition to the above differences, the abdominal apodemes are, in all specimens except one, rudimentary indicating either parasitization or some other form of abnormality, both possibilities being supported by the reduction in colouration and size. Although rudimentary apodemes and malformed genitalia often occur together as the clear result of parasitization, the precise cause is at other times uncertain. In the present case, the perfect development of the genitalia themselves renders the possibility of parasitization somewhat doubtful, suggesting an alternative cause of abnormality. Two explanations may be offered. These forms are either a further expression of the individual variation found to be present in Tulare County and the Sequoia and Yosemite National Parks populations, the poorly developed apodemes being purely coincidental, or they may be the result of hybridization between *D. rufula* and *D. retusa* Beamer, the rudimentary apodemes together with the paler colour and smaller size being a symptom of the lower viability of the resultant hybrids. Since *D. rufula* is more widespread, and evidently the more successful of the two species, the predominence of its characters in any hybrid population, as seen in fact in the present forms, would be expected. If they are hybrids we can expect to find *D. retusa* more widespread than at present indicated since single specimens of similar, but less evident, "intermediate" forms have been found at Strawberry and Cuyamaca Lake, California. Whichever of the above explanations is correct, both *D. rufula* and *D. retusa* Beamer are here considered as distinct species. If the "intermediate" forms found at Monterey do indicate a crossing, their relatively poorly developed nature is a symptom of the general imbalance of their genotypes and their obvious inability to produce the correct mating call, as a result of the rudimentary apodemes, and hence compete successfully with the males of either of the two parent species. They are possibly the last visible indications of a relatively recent evolutionary splitting of what were once two subspecies.

Dikraneura rubica DeLong & Caldwell

(Text-figs. 277–289)

Dikraneura (*Notus*) *rubica* DeLong & Caldwell, 1937*a* : 28.

Length: ♂ 3·52–3·80 mm. (mean 3·66 mm.). ♀ 3·76 mm.

Form and colour as in *D. rufula* Gillette but with vertex slightly less produced, the apex less acutely rounded and with patches on posterior region of vertex and anterior region of pronotum pale orange and much less distinct and ventral surface of abdomen pale whitish yellow.

Male apodemes elongate, each with length approximately 3 times width, extending to posterior end of fifth segment.

Male genitalia as in *D. rufula* Gillette but with apical processes of aedeagus more closely apposed, the apical spine on posterior margin absent, the lateral processes arising immediately basad of apex alongside distal half of gonopore and anterior processes less acute and mounted on anterior prolongation of shaft.

Female genitalia with posterolateral angles of sternum VII broadly rounded, posterior margin shallowly concave medially.

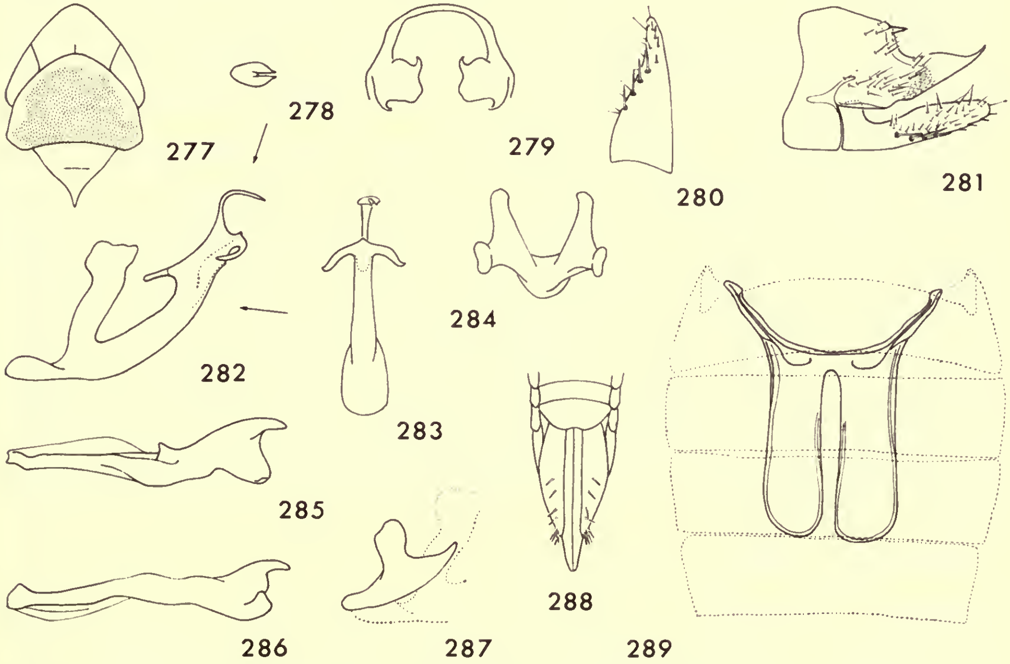
Distribution. Arizona (DeLong & Caldwell, 1937*a*).

Specimens seen. UNITED STATES: Ariz., White Mts., 1 ♂, 19.vi.1950 (*R. H Beamer*).

The holotype ♂ and allotype ♀ (UNITED STATES: Ariz., Grand Canyon, 11.viii.27 (*R. H. Beamer*)), located in the DeLong Collection, Ohio State University, were also studied. The year of both these specimens differs from that given in the original description. The genitalia of the holotype are also missing from the vial although the specimen in all other respects agrees with the single male specimen studied from the White Mountains, Arizona. The genitalia of the holotype are also well illustrated in the original description and agree with those in the specimen from the White Mountains with the exception that the processes on the anterior surface of the aedeagal shaft are referred to as a single spine rather than paired processes. Two additional specimens with the holotype and allotype and bearing the same data, are labelled as paratypes. One is a female and the other has its abdomen missing. Neither of these specimens were mentioned in the original description.

Biology. *Dikraneura rubica* has been previously recorded only once, during August in Arizona (DeLong & Caldwell, 1937*a*). Specimens at hand show it to be present in this state also during June.

Remarks. *Dikraneura rubica* is closely related to both *D. retusa* Beamer and *D. rufula* Gillette, resembling the latter species externally but with the markings on the vertex and pronotum much less distinct, the venter of the abdomen whitish yellow rather than dark brown and with the vertex slightly less produced with the apex less acutely rounded. The pygofer of all three species is more or less identical as are also the facies of the aedeagus. In the latter structure, *D. rubica* resembles *D. retusa* in the possession of posterolateral processes and *D. rufula* in the possession of elongate anterior processes. It differs from both these species however by the absence of the posterior medial spine on the aedeagus and the longer male apodemes.



Figs. 277–289. *Dikraneura rubica* DeLong & Caldwell. 277, head, pronotum and scutellum, dorsal view; 278, apical processes of aedeagus, dorsal view in direction of arrow in fig. 282; 279, male pygofer, posterior view; 280, left subgenital plate, ventral view; 281, male pygofer, valve and subgenital plate, left lateral view; 282, aedeagus, left lateral view; 283, aedeagus, posterior view in direction of arrow in fig. 282; 284, connective, anterodorsal view; 285, left style, dorsal view; 286, left style, left lateral view; 287, connective, left lateral view; 288, female genitalia, ventral view; 289, abdominal apodemes, dorsal view. Scale as in figs. 1–16.

Dikraneura vittata Borland

(Text-figs. 290–305)

Dikraneura vittata Borland, 1955*a* : 158.

Length: ♂ 4·00–4·38 mm. (mean 4·11 mm.). ♀ 4·00–4·24 mm. (mean 4·08 mm.).

Head with width narrower than that of pronotum, vertex angularly produced with apex narrowly or broadly rounded in dorsal aspect, more produced and acutely angled in female, medial length 1½ times length next eyes, broadly rounded to face with latter slightly longer than wide, ocellocular area equal in width to antennal fossa; pronotum with width increasing posteriorly.

Colour of face pale brownish, lora and genae whitish cream, eyes testaceous, vertex and pronotum whitish cream with a longitudinal vitta on each side of midline, from apex of vertex to posterior margin of pronotum, reddish. Scutellum whitish cream with disc marked with yellow, basal angles reddish, sometimes yellow; remainder of thorax with dorsum dark brown, venter pale stramineous. Legs pale stramineous. Fore wings with basal area subhyaline reddish, area between vein *M* and costal margin yellowish, internal edge of clavus, claval vein, claval suture and vein *Cu* to base of apical cell, whitish; apical half hyaline, smoky brown, veins creamish. Hind wings hyaline, veins dark brown. Abdomen with dorsum dark brown to black, lateral edge pale yellow; venter dark brown to black with lateral and posterior edges of sternites pale yellow; male pygofer light brown paling posteroventrally to cream, anal tube cream, valve and subgenital plates concolorous cream; female pygofer pale stramineous with dorsum and apex of ovipositor beyond pygofer dark brownish, sternum VII pale stramineous with medial area of posterior margin light brown.

Male apodemes elongate, each with length approximately 2½ times width, extending to near posterior margin of fourth segment.

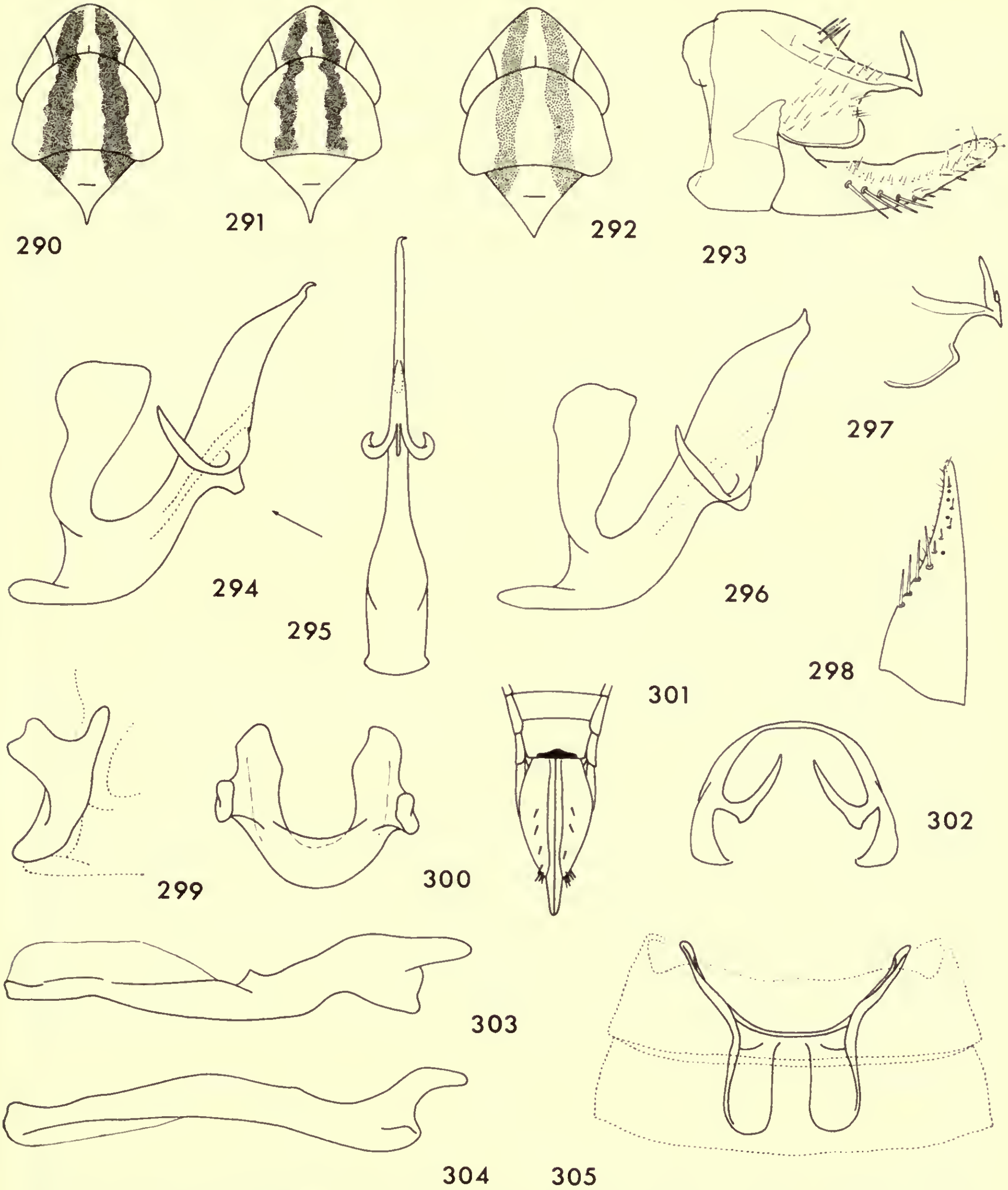
Male genitalia with pygofer tapering abruptly posteriorly in lateral aspect to an elongate process directed posteromesally and sharply recurved dorsomesally approximately one third distance from its base, without teeth or with a single one only on posterior margin immediately distad of elbow; dorsolateral margin with a small group of spine-like setae near midlength; lateral surface with numerous short setae scattered over posterior half. Aedeagus with preatrium short; basal apodeme well developed, directed dorsally, laterally compressed and expanded apically; shaft elongate, directed posterodorsally, laterally compressed, tapering towards apex and terminating in a short variously directed peg-like process, posterior margin produced near midlength as a laterally compressed nose-like projection, a pair of elongate processes posterolaterally immediately distad of projection, curving ventrolaterally and then anterodorsally; gonopore on posterior margin immediately distad of posterolateral processes.

Female genitalia with posterior margin of sternum VII transverse and heavily sclerotized medially.

Distribution. Mexico (Borland, 1955*a*).

Specimens seen. MEXICO: Vera Cruz, 9 miles N.W. Jalapa, 1 ♂, 31.xii.1949, (*R. H. Beamer*); Vera Cruz, Jalapa, 1 ♂, 1 ♀, 1.iv.1963 (*C. G. Martell*).

The holotype ♂ (MEXICO: Vera Cruz, 9 miles N.W. Jalapa, 31.xii.1949 (*L. D. Beamer*)), allotype ♀ (MEXICO: Vera Cruz, 9 miles N.W. Jalapa, 31.xii.1949 (*R. H. Beamer*)), 11 ♂, 1 ♀ paratypes (same data as holotype) and 1 ♂, 1 ♀ paratypes (same data as allotype), located in the Snow Museum, University of Kansas, were also studied. An additional 1 ♂ paratype (MEXICO: Vera Cruz, 9 miles N.W. Jalapa, 31.xii.1949 (*R. H. Beamer*)), also located in the Snow Museum, is a new species, *D. jalapensis*, of which it is designated paratype.



FIGS. 290–305. *Dikraneura vittata* Borland. 290, head, pronotum and scutellum, dorsal view (male); 291, same (male); 292, same (female); 293, male pygofer, valve and subgenital plate, left lateral view; 294, aedeagus (Vera Cruz, Mexico), left lateral view; 295, aedeagus, posterior view in direction of arrow in fig. 294; 296, aedeagus (Vera Cruz, Mexico), left lateral view; 297, posterior process of male pygofer showing basal tooth, left lateral view; 298, left subgenital plate, ventral view; 299, connective, left lateral view; 300, connective, anterior view; 301, female genitalia, ventral view; 302, male pygofer, posterior view; 303, left style, dorsal view; 304, left style, left lateral view; 305, abdominal apodemes, dorsal view. Scale as in figs. 1–16.

Biology. Known only from Mexico, *Dikraneura vittata* has been recorded only during December (Borland, 1955*a*). Of the specimens at hand, some were taken during December and the remainder during April.

Remarks. *Dikraneura vittata* is related to *D. beameri* Borland in the shape of the aedeagus but is unique in its posterior nose-like projection on the shaft. It differs markedly however from *D. beameri* in the more elongate form of the pygofer processes which resemble those of *D. serrata* DeLong & Caldwell. The latter species differs from *D. vittata* however in having 1–3 teeth on each process, the latter being also more anteriorly recurved, and in the shape of the aedeagus. The shape of the female VIIth sternum also indicates the close relationship of *D. vittata* to both these species. In the shape of the pygofer, which resembles in general that of all the previously described species in this paper, and the shape of the aedeagus, which resembles all the species described here after, *D. vittata* may be considered an intermediate form between these two major groups (see discussion).

Dikraneura serrata DeLong & Caldwell

(Text-figs. 306–317)

Dikraneura (*Notus*) *serrata* DeLong & Caldwell, 1937*a* : 24.

Length: ♂ 3·80–4·00 mm. (mean (3·94 mm.). ♀ 4·18 mm.

Form and colour as in *D. vittata* Borland but with vertex slightly more produced and acutely angled, longitudinal vittae on head and pronotum and basal area of fore wings paler or orange and basal angles of scutellum and ventral surface of abdomen pale yellow.

Male apodemes elongate, each with length approximately 2½ times width, extending to anterior region of fifth segment.

Male genitalia with pygofer as in *D. vittata* Borland but with recurved portion of processes directed more anteriorly and with a ventrally directed tooth at elbow and 1–3 smaller teeth along posterior margin. Aedeagus with preatrium short; basal apodeme well developed, directed dorsally; shaft elongate, laterally compressed, directed dorsoposteriorly with apex deeply and broadly emarginate in lateral aspect, the ventral margin of concavity mildly bifurcate apically, the basal half of shaft much narrower in lateral aspect than distal half and with a large rugose lobe on each side at its base; a pair of elongate processes posteriorly near midlength, directed laterally and anterodorsally; gonopore on posterior surface between bases of posterior processes.

Female genitalia with posterior margin of sternum VII transverse with medial region slightly produced and lightly sclerotized.

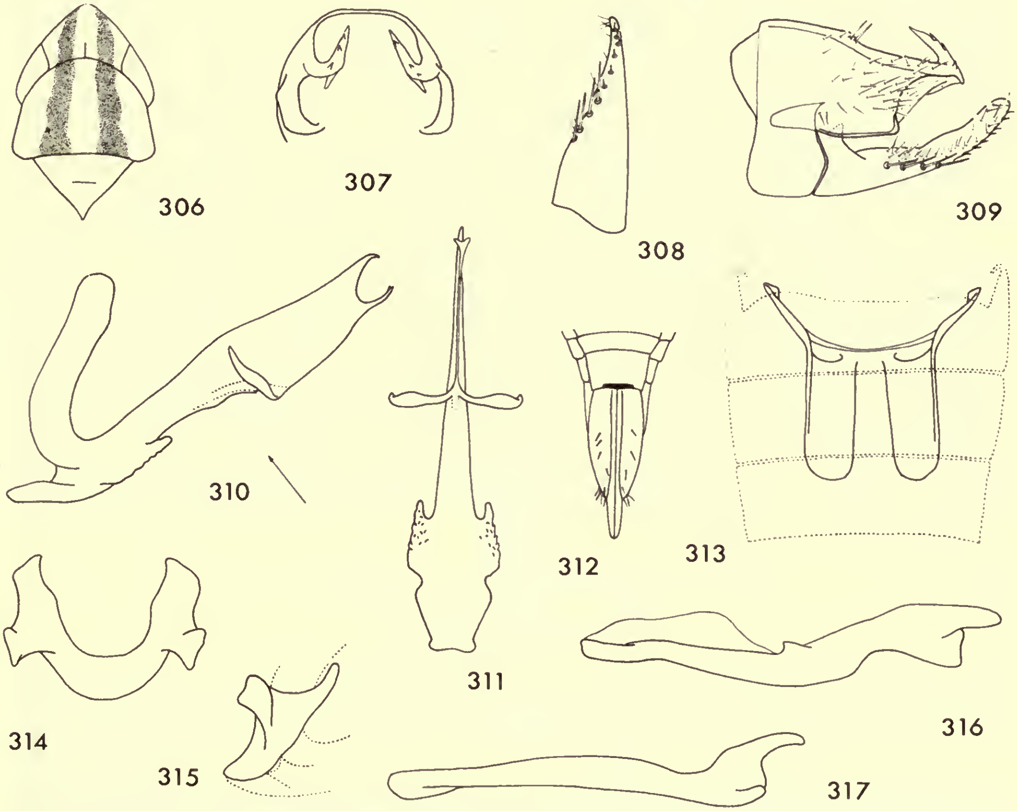
Distribution. Arizona (DeLong & Caldwell, 1937*a*), Mexico (Ruppel & DeLong, 1953*e*).

Specimens seen. UNITED STATES: Ariz., Santa Rita Mts., 2 ♂, 1 ♀, 10.vii.1950 (*R. H. Beamer*).

The holotype ♂, allotype ♀, 6 ♂, 14 ♀ paratypes (UNITED STATES: Ariz., Santa Rita Mts., 12.vi.33 (*R. H. Beamer*)), 2 ♂, 4 ♀ paratypes (UNITED STATES: Ariz., Santa Rita Mts., 17.vii.32 (*R. H. Beamer*)) and 2 paratypes (same data as holotype) with abdomens missing, all located in the Snow Museum, University of Kansas, and 1 ♂ paratype (UNITED STATES: Ariz., Santa Rita Mts., 17.vii.32 (*R. H. Beamer*)) and 3 ♂, 5♀ paratypes (same data as holotype), located in the DeLong Collection, Ohio State University, were also studied.

Biology. The only date previously recorded for *D. serrata* is June in Arizona (DeLong & Caldwell, 1937*a*). Specimens at hand were taken during July in this state. In Mexico, this species, together with other members of the genus, is apparently restricted to the pine regions of the higher altitudes (Ruppel & DeLong, 1953*e*).

Remarks. *Dikraneura serrata* resembles *D. vittata* Borland in general appearance although the red colouration on the vertex, pronotum and fore wings is less vivid than in the latter species. It is related to *D. vittata* also in the elongate form of the pygofer process but may be distinguished by the constant presence of teeth along its posterior margin and its more anteriorly directed recurved portion. The general shape of the aedeagus is similar to that of both *D. beameri* Borland and *D. vittata* but *D. serrata* is unique in having lobes at the base of the shaft and the emargination at its apex.



FIGS. 306–317. *Dikraneura serrata* DeLong & Caldwell. 306, head, pronotum and scutellum, dorsal view; 307, male pygofer, posterior view; 308, left subgenital plate ventral view; 309, male pygofer, valve and subgenital plate, left lateral view; 310, aedeagus, left lateral view; 311, aedeagus, posteroventral view in direction of arrow in fig. 310; 312, female genitalia, ventral view; 313, abdominal apodemes, dorsal view; 314, connective, dorsal view; 315, connective. left lateral view; 316, left style, dorsal view; 317, left style, left lateral view. Scale as in figs. 1–16.

Dikraneura beameri Borland

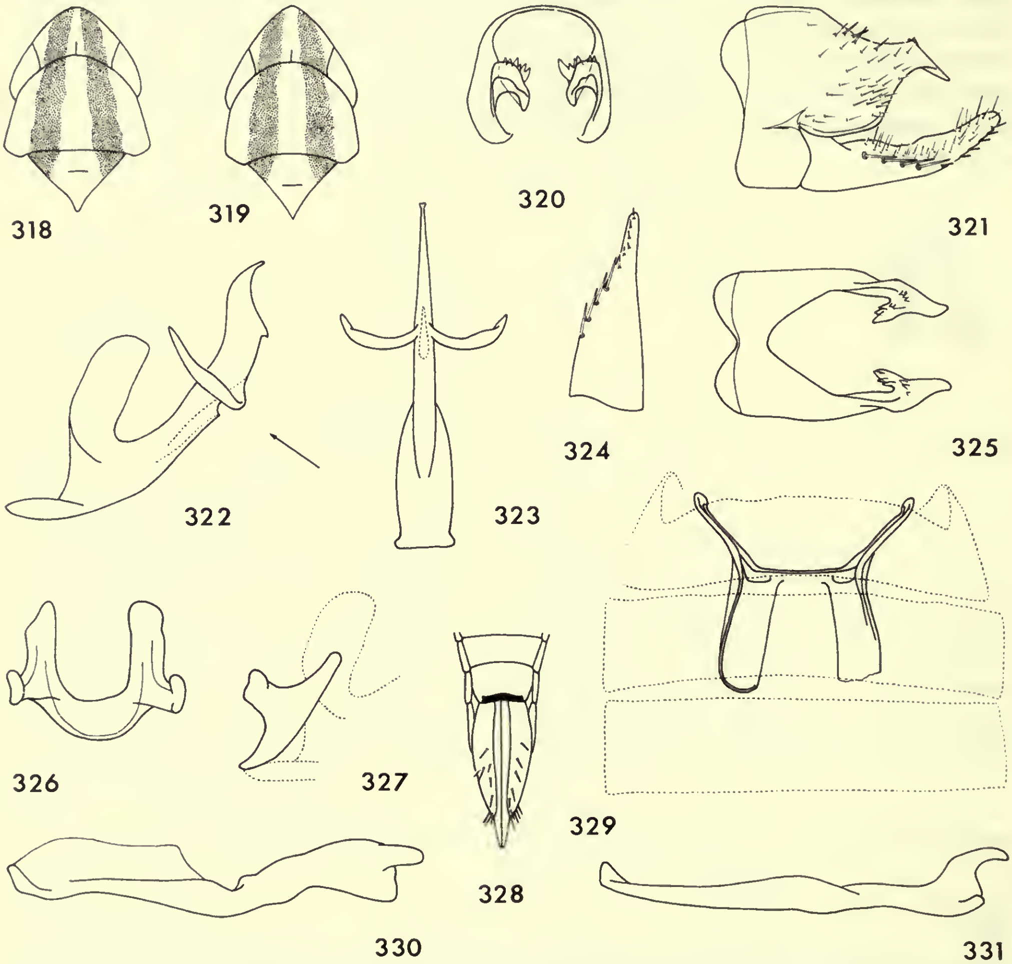
(Text-figs. 318–331)

Dikraneura beameri Borland, 1955*a* : 159.

Length: ♂ 3·70–4·12 mm. (mean 3·94 mm.). ♀ 3·90–4·12 mm. (mean 4·00 mm.).

Form and colour as in *D. vittata* Borland.

Male apodemes elongate, narrow, each with length approximately 2½ times width, extending to posterior margin of fourth segment.



Figs. 318–331. *Dikraneura beameri* Borland. 318, head, pronotum and scutellum, dorsal view (male); 319, same (female); 320, male pygofer, posterior view; 321, male pygofer, valve and subgenital plate, left lateral view; 322, aedeagus, left lateral view; 323, aedeagus, posteroventral view in direction of arrow in fig. 322; 324, left subgenital plate, ventral view; 325, male pygofer, dorsal view; 326, connective, anterodorsal view; 327, connective, left lateral view; 328, female genitalia, ventral view; 329, abdominal apodemes, dorsal view; 330, left style, dorsal view; 331, left style, left lateral view. Scale as in figs. 1–16.

Male genitalia with pygofer tapering posteriorly in lateral aspect and terminating dorsoposteriorly in a short robust process recurved anteromesally, its dorsal surface with numerous stout teeth; dorsolateral margin with a group of spine-like setae near midlength; lateral surface with numerous short setae over posterior half. Aedeagus with preatrium short; basal apodeme well developed, directed dorsally; shaft elongate, laterally compressed, directed dorsoposteriorly with apical one-fifth tapered and curving more posteriorly; posterior margin at base of tapered sector acutely produced, sometimes weakly so; a pair of elongate posterior processes immediately distad of midlength directed laterally and anterodorsally; gonopore on posterior margin between bases of posterior processes.

Female genitalia with posterior margin of sternum VII transverse and lightly sclerotized.

Distribution. Mexico (Borland, 1955*a*).

Specimens seen. MEXICO: Vera Cruz, 9 miles N.W. Jalapa, 1 ♂, 31.xii.1949 (*R. H. Beamer*); Vera Cruz, Jalapa, 5 ♂, 2 ♀, 1.iv.1963 (*C. G. Martell*).

The holotype ♂, allotype ♀, 13 ♂, 1 ♀ paratypes (MEXICO: Vera Cruz, 9 miles N.W. Jalapa, 31.xii.1949 (*R. H. Beamer*)) and 14 ♂, 4 ♀ paratypes (MEXICO: Vera Cruz, 9 miles N.W. Jalapa, 31.xii.1949 (*L. D. Beamer*)), together with 5 paratypes (same data as holotype) and 1 paratype (MEXICO: Vera Cruz, 9 miles N.W. Jalapa, 31.xii.1949 (*L. D. Beamer*)) with abdomens missing, all located in the Snow Museum, University of Kansas, were also studied. An additional 1 ♂ paratype (MEXICO: Vera Cruz, 9 miles N.W. Jalapa, 31.xii.1949 (*R. H. Beamer*)) is a new species *D. jalapensis*, of which it is designated holotype, and another 1 ♂ paratype (same data) is *D. ardea* Ruppel & DeLong. Both these specimens are in the Snow Museum.

Biology. Restricted to Mexico, *Dikraneura beameri* was recorded by Borland (1955*a*) in December. Specimens at hand were taken in December and also in April.

Remarks. Externally, *Dikraneura beameri* is indistinguishable from *D. vittata* Borland although each has distinct male genitalia. In the shape of the pygofer, *D. beameri* resembles the species *D. jalapensis* sp. n., *D. dreisbachi* sp. n. and *D. halberda* Ruppel & DeLong. It is also similar to the first two of these species, as well as to *D. vittata* and *D. serrata* DeLong & Caldwell, in the facies of the aedeagus, each however being readily distinguished from the others.

***Dikraneura jalapensis* sp. n.**

(Text-figs. 332–344)

Length: ♂ 3·62–3·82 mm. (mean 3·72 mm.).

Form and colour as in *D. vittata* Borland but paler with anterior half of longitudinal vittae yellowish and with basal area of fore wings sometimes yellow.

Male apodemes elongate, narrow, each with length 3 times width, extending to posterior end of fourth segment.

Male genitalia as in *D. beameri* Borland but with pygofer processes recurved more anteriorly and aedeagus with its distal half in lateral aspect approximately twice width of basal half and tapering abruptly near apex to a pair of short anteriorly directed processes, their apices curving mesad.

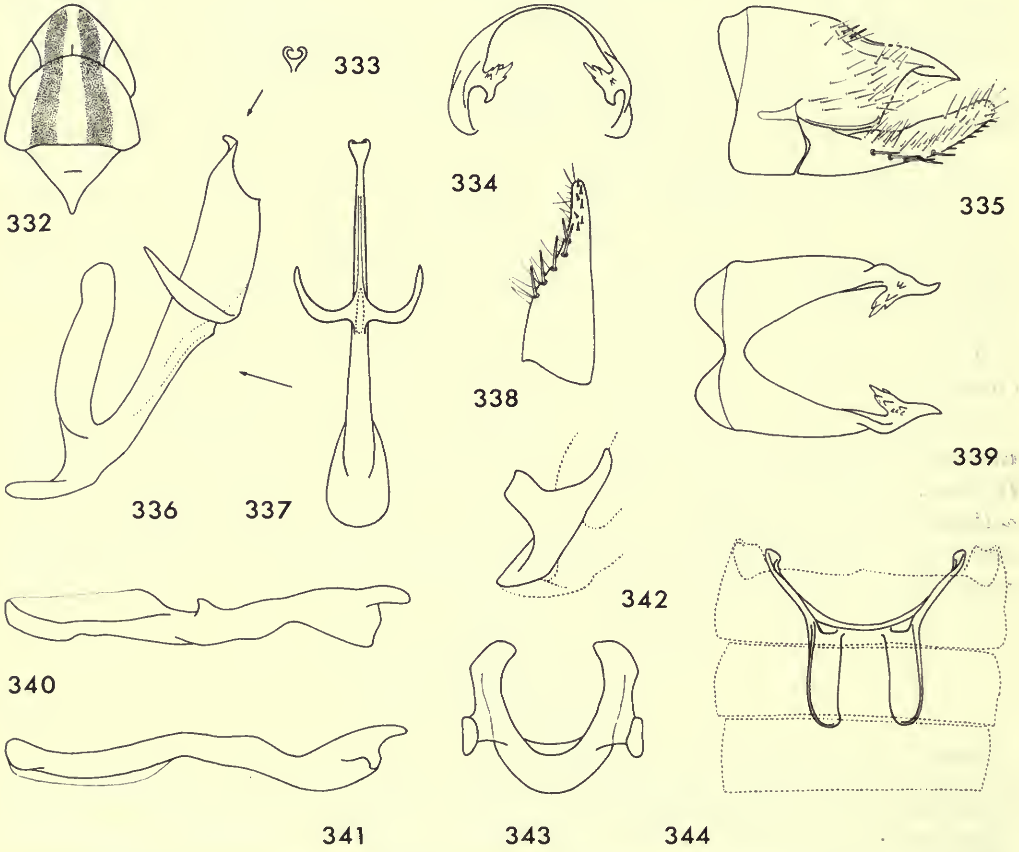
Female unknown.

Holotype ♂. MEXICO: Vera Cruz, 9 miles N.W. Jalapa, 31.xii.1949 (*R. H. Beamer*), in Snow Museum, University of Kansas.

Paratype. 1 ♂, same data as holotype, in Snow Museum.

Biology. Restricted to Mexico, *Dikraneura jalapensis* has been taken only during December.

Remarks. *Dikraneura jalapensis* is closely related to *D. beameri* Borland but with the pygofer processes recurved more anteriorly rather than anterodorsally and with distinct aedeagus. Externally, the two species are indistinguishable except that *D. jalapensis* is paler with the longitudinal vittae on the vertex and pronotum less vivid. The holotype and paratype of the present species were originally designated, without dissection, as paratypes of *D. beameri* and *D. vittata* Borland respectively.



FIGS. 332–344. *Dikraneura jalapensis* sp. n. 332, head, pronotum and scutellum, dorsal view; 333, apical processes of aedeagus, dorsal view in direction of arrow in fig. 336; 334, male pygofer, posterior view; 335, male pygofer, valve and subgenital plate, left lateral view; 336, aedeagus, left lateral view; 337, aedeagus, posterior view in direction of arrow in fig. 336; 338, left subgenital plate, ventral view; 339, male pygofer, dorsal view; 340, left style, dorsal view; 341, left style, left lateral view; 342, connective, left lateral view; 343, connective, anterodorsal view; 344, abdominal apodemes, dorsal view. Scale as in figs. 1–16.

On the basis of the pygofer and aedeagus, *D. jalapensis* is also very closely related to *D. dreisbachi* sp. n. although the pygofer processes in *D. jalapensis* are slightly less robust, directed more anteriorly and lack a sclerotized plate. The aedeagus is also less elongate in *D. jalapensis* with its distal half markedly wider than the basal half and with the gonopore opening between instead of distad of the posterior processes. The abdominal apodemes of the two species are also diagnostic, those of *D. jalapensis* being much narrower and wider apart. Externally, the two species are indistinguishable.

***Dikraneura dreisbachi* sp. n.**

(Text-figs. 345–356)

Length: ♂ 4·36 mm.

Form and colour as in *D. vittata* Borland but paler with anteclypeus and frontoclypeus yellowish, anterior half of longitudinal vittae yellow marked with orange and basal area of fore wings pale pinkish.

Male apodemes elongate, each with length approximately twice width, extending to anterior region of fifth segment.

Male genitalia as in *D. beameri* Borland but with pygofer processes slightly shorter and with fewer teeth, dorsomesal margin of pygofer along apical third with a thin sclerotized plate directed mesally and tapering towards apex of posterior process, and aedeagus with shaft more elongate and tapering near apex to a pair of short anteriorly directed processes as in *D. jalapensis* sp. n., their apices turned mesad, posterior margin at base of tapered section slightly produced and turned dextrally and with posterolateral processes immediately basad of gonopore.

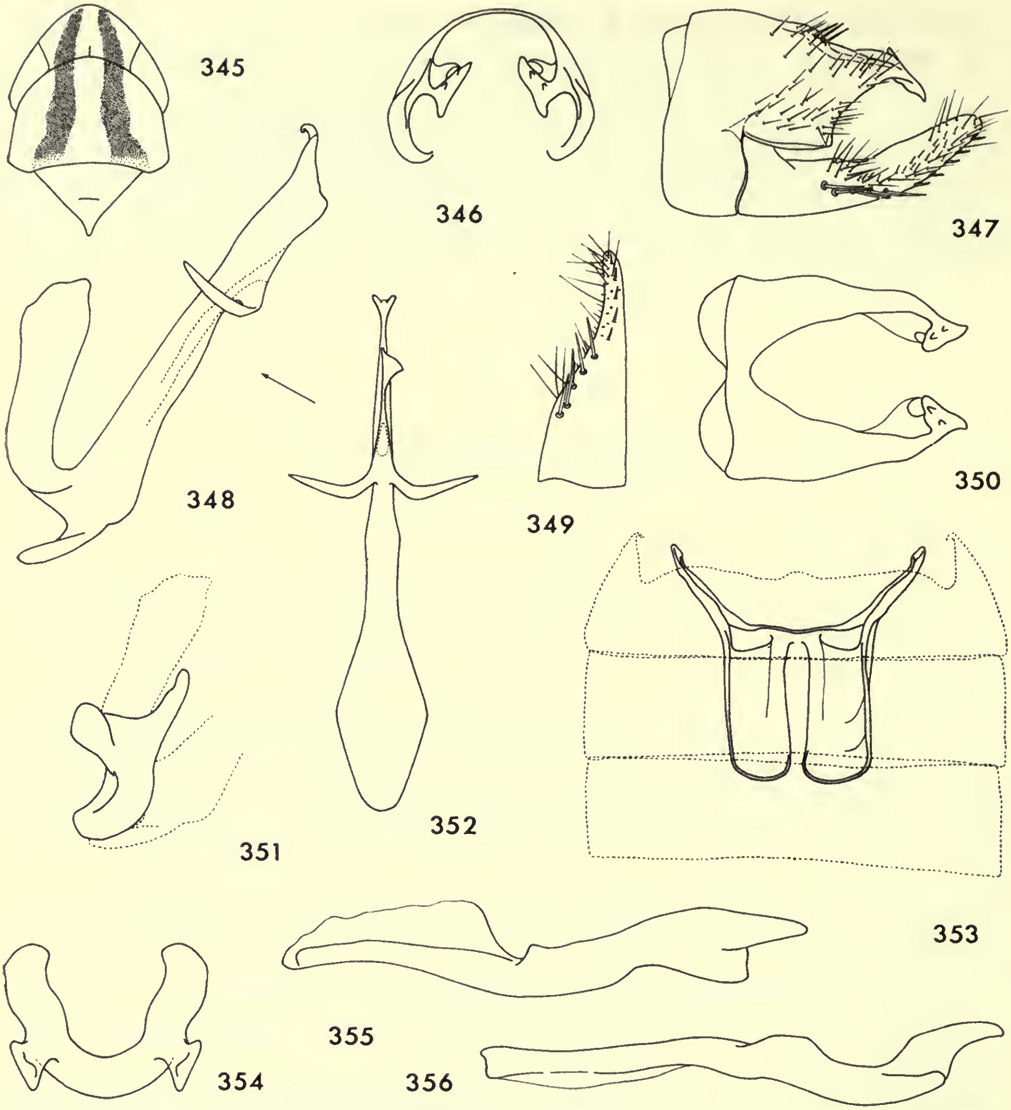
Female unknown.

Holotype ♂. MEXICO: Texpan, 7,500′, 12.viii.54 (*R. R. Dreisbach*), in U.S. National Museum.

This species is named in honour of its collector, R. R. Dreisbach.

Biology. *Dikraneura dreisbachi* is known only from the holotype taken in Mexico in August at 7,500′.

Remarks. *Dikraneura dreisbachi* is similar in male genitalia to both *D. beameri* Borland and *D. jalapensis* sp. n. although more closely related to the latter on the basis of the aedeagus. It differs however from both these species by the relatively shorter pygofer processes, the presence of fewer teeth along the length of the latter, the unique presence of a sclerotized plate dorsomesally at the base of each process and the much wider abdominal apodemes. The aedeagus also differs from that of *D. jalapensis* by being more elongate, of approximately uniform width throughout in lateral aspect and with the gonopore situated distad of, rather than level with, the bases of the posterior processes. Externally, all three species are very similar with the exception that, like *D. jalapensis*, *D. dreisbachi* is much paler than *D. beameri* with the longitudinal vittae on the vertex and pronotum less vivid.



Figs. 345–356. *Dikraneura dreisbachi* sp. n. 345, head, pronotum and scutellum, dorsal view; 346, male pygofer, posterior view; 347, male pygofer, valve and subgenital plate, left lateral view; 348, aedeagus, left lateral view; 349, left subgenital plate, ventral view; 350, male pygofer, dorsal view; 351, connective, left lateral view; 352, aedeagus, posterior view in direction of arrow in fig. 348; 353, abdominal apodemes, dorsal view; 354, connective, anterior view; 355, left style, dorsal view; 356, left style, left lateral view. Scale as in figs. 1–16.

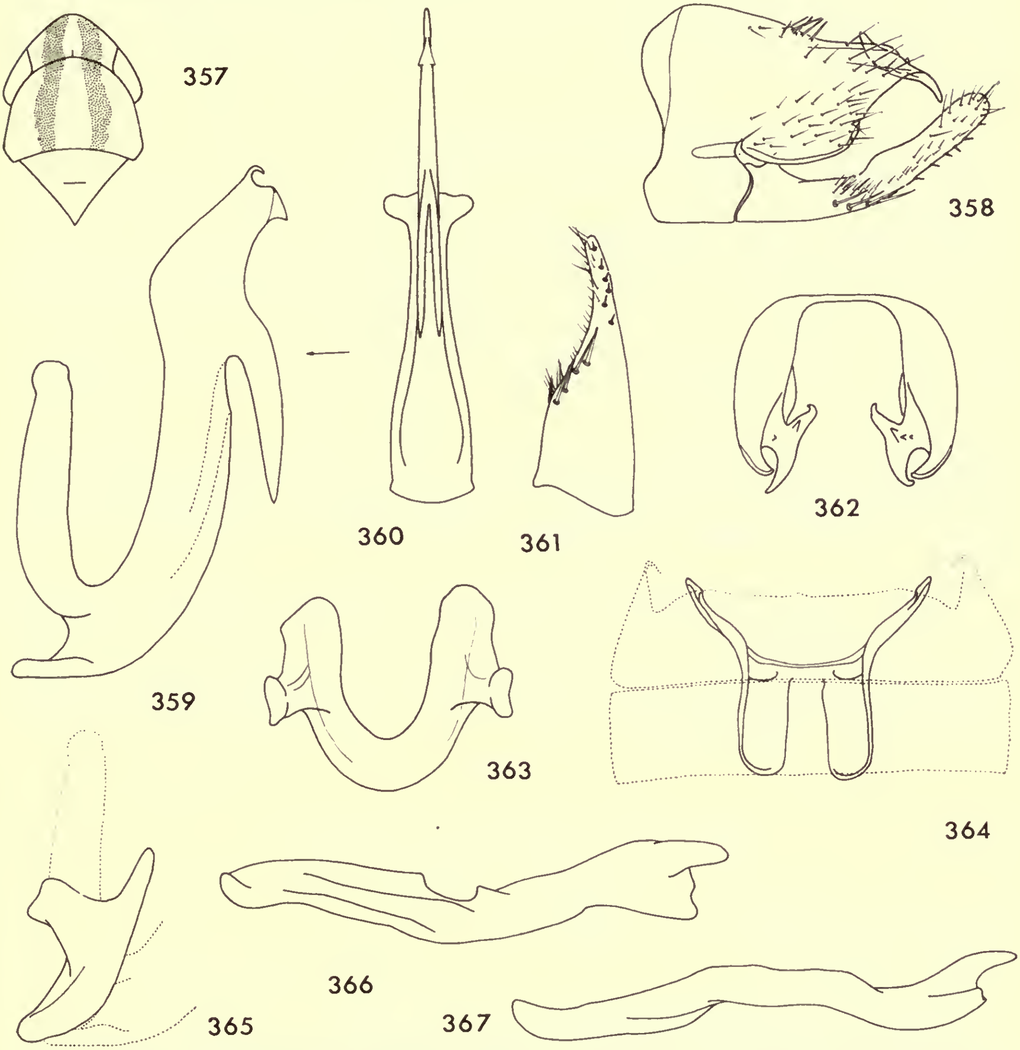
It is possible that *D. dreisbachi* may prove to be simply a variant of *D. jalapensis* sp. n. in the light of additional specimens. In view of the constancy in the shape of the genitalia in related species however, the two are here considered as distinct species.

Dikraneura halberda Ruppel & DeLong

(Text-figs. 357–367)

Dikraneura halberda Ruppel & DeLong, 1953*e* : 350.

Length: ♂ 3·90–4·60 mm. (mean 4·23 mm.).
Form and colour as in *D. vittata* Borland.



Figs. 357–367. *Dikraneura halberda* Ruppel & DeLong. 357, head, pronotum and scutellum, dorsal view; 358, male pygofer, valve and subgenital plate, left lateral view; 359, aedeagus, left lateral view; 360, aedeagus, posterior view in direction of arrow in fig. 359; 361, left subgenital plate, ventral view; 362, male pygofer, posterodorsal view; 363, connective, anterodorsal view; 364, abdominal apodemes, dorsal view; 365, connective, left lateral view; 366, left style, dorsal view; 367, left style, left lateral view. Scale of head as in fig. 237, rest as in figs. 1–16.

Male apodemes elongate, each with length approximately twice width, extending to posterior margin of fourth segment.

Male genitalia with pygofer as in *D. beameri* Borland but with fewer teeth on dorsal surface of process. Aedeagus with preatrium short; basal apodeme elongate, directed dorsally; shaft elongate, laterally compressed, directed dorsally with distal one-fourth turned slightly posterodorsally with extreme apex finger-like in lateral aspect and hooked posteriorly; a pair of short broadly triangular subapical processes on posterior margin, directed posteriorly and slightly divergent; a pair of elongate, laterally compressed parallel processes posteriorly, approximately one-third distance from apex, directed ventrally; gonopore on posterior margin immediately basad of latter processes.

Female unknown.

Distribution. Mexico (Ruppel & DeLong, 1953*e*).

Specimens seen. MEXICO: W. Cortez Pass, 8,500′, 1 ♂, 13.viii.54 (*R. R. Dreisbach*).

The holotype ♂ and 1 ♂ paratype (MEXICO: D. F., Mexico City, 13.ix.39 (*D. M. DeLong*)), 1 ♂ paratype (MEXICO: D. F., Mexico City, 13.ix.39 (*DeLong, Good, Caldwell & Plummer*)), 3 ♂ paratypes (MEXICO: D. F., Chapultepec Mts., MB 150, 16.ii.26 (*A. Dampf*)) and 2 ♂ paratypes (MEXICO: Desierto de los Leones, MF 2913, Mexico City, 8.i.33 (*no collector*)), located in the DeLong Collection, Ohio State University, were also studied.

Biology. *Dikraneura halberda*, known only from Mexico, has been recorded in September, October, November and January and, together with other species of the genus, is considered to be restricted to the pine regions of the higher altitudes (Ruppel & DeLong, 1953*e*). Specimens at hand show it to be present also during August.

Remarks. *Dikraneura halberda* is related to *D. beameri* Borland, *D. jalapensis* sp. n. and *D. dreisbachi* sp. n. in the general shape of the pygofer but is readily distinguished from all these species by the shape of the aedeagus with its unique ventrally directed posterior processes. Externally, it is indistinguishable from either *D. beameri* or *D. vittata* Borland.

Dikraneura stonei Ruppel & DeLong

(Text-figs. 368–377)

Dikraneura stonei Ruppel & DeLong, 1953*e* : 349.

Length: ♂ 3·72 mm.

Form and colour as in *D. vittata* Borland. (Colour of abdomen not obtainable).

Male apodemes and base of abdomen missing from holotype.

Male genitalia with pygofer tapering posteriorly in lateral aspect and terminating in an elongate posteromesally directed process, recurved dorsomesally near its apex and with an elongate process dorsally midway between its base and recurved portion; lateral surface with short setae over posterior half. Aedeagus with preatrium short; basal apodeme well developed, directed dorsally; shaft elongate, directed posterodorsally but slightly sinuous in lateral aspect near midlength, laterally compressed over distal half and tapering in lateral aspect towards a short finger-like process, its apex weakly bifurcate in posteroventral aspect; a pair of thin elongate parallel processes on posterior margin just distad of midlength, directed ventrally, their apices turned posteriorly; a pair of stouter posterolateral processes immediately basad of latter, directed anterolaterally; gonopore on posterior margin between bases of thinner processes.

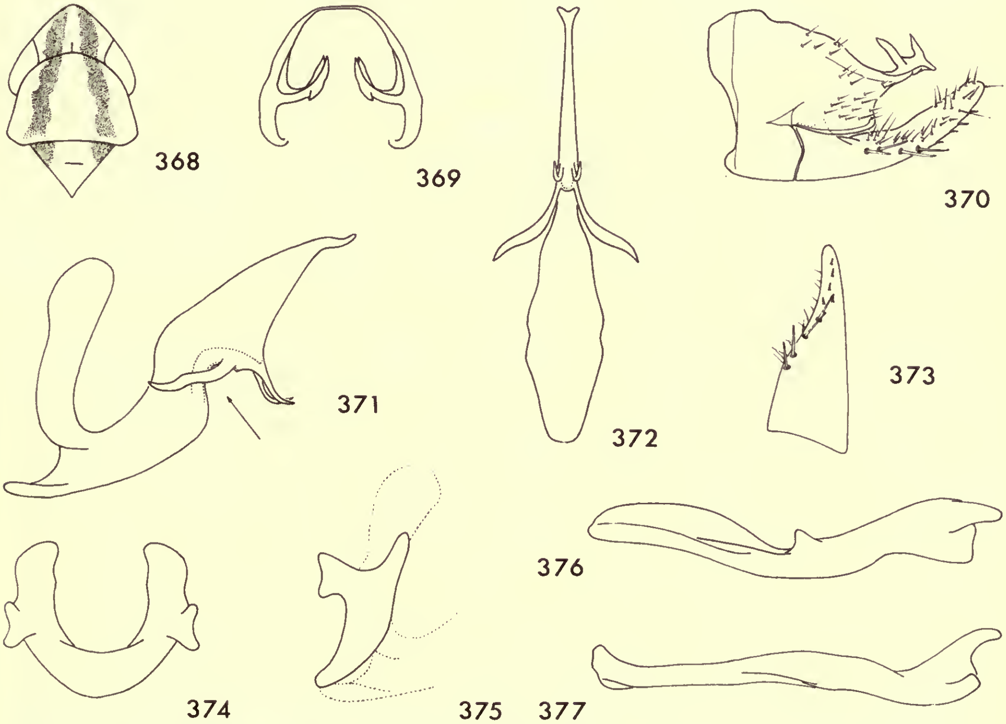
Female unknown.

Distribution. Mexico (Ruppel & DeLong, 1953*e*).

Specimens seen. Only the holotype ♂ (Mexico: Mexico, Cuernavaca Rd., 20.viii.36 (*Ball & Stone*)), in the U.S. National Museum, was available for study.

Biology. The holotype of *Dikraneura stonei* was taken during August in Mexico. Together with other members of the genus, it is apparently restricted to the pine regions of the higher altitudes (Ruppel & DeLong, 1953*e*).

Remarks. *Dikraneura stonei*, although undoubtedly related to *D. vittata* Borland and *D. beameri* Borland in the general shape of the pygofer and aedeagus, is unique in the shape of the pygofer process and the presence of two pairs of posterior processes near the midlength of the aedeagus, the latter being found in only one other species, *D. denticulata* sp. n. from Nepal. Externally, *D. stonei* is indistinguishable from *D. vittata* although slightly smaller.



Figs. 368–377. *Dikraneura stonei* Ruppel & DeLong. 368, head, pronotum and scutellum, dorsal view; 369, male pygofer, posterior view; 370, male pygofer, valve and subgenital plate, left lateral view; 371, aedeagus, left lateral view; 372, aedeagus, ventroposterior view in direction of arrow in fig. 371; 373, left subgenital plate, ventral view; 374, connective, anterior view; 375, connective, left lateral view; 376, left style, dorsal view; 377, left style, left lateral view. Scale as in figs. 1–16.

Dikraneura angustata Ball & DeLong

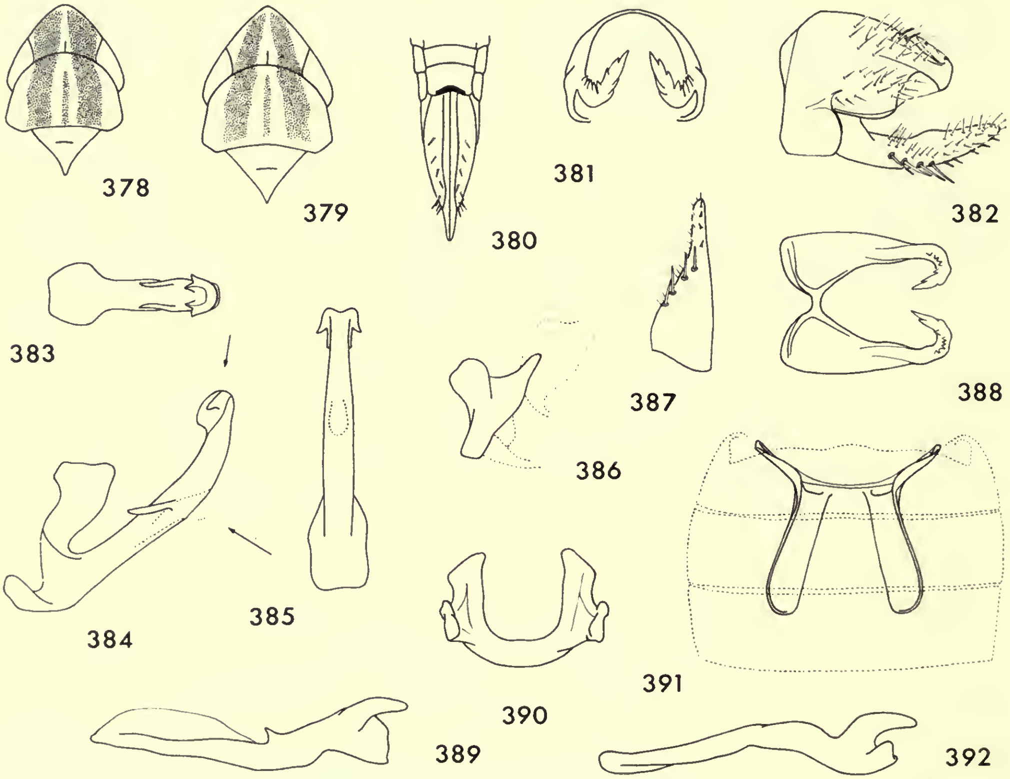
(Text-figs. 378–392)

Dikraneura angustata Ball & Delong, 1925*a* : 328.

Length: ♂ 3·00–3·60 mm. (mean 3·29 mm.). ♀ 3·34–3·80 mm. (mean 3·56 mm.).

Head with width equal to or slightly narrower than that of pronotum, vertex angularly produced with apex broadly rounded in dorsal aspect, more markedly produced and acutely angled in female, medial length approximately twice length next eyes, broadly rounded to face with latter as long as wide, ocellocular area equal in width to antennal fossa; pronotum with width increasing slightly posteriorly.

Colour of face pale brownish, sometimes washed with yellow, frontoclypeus between antennae diffuse reddish brown, often faintly so, lora and genae cream, vertex yellow with medial stripe and occasionally area alongside each eye cream, eyes testaceous. Pronotum cream, disc sordid, a longitudinal vitta on each side of midline, and a much narrower sometimes indistinct



Figs. 378–392. *Dikraneura angustata* Ball & DeLong. 378, head, pronotum and scutellum, dorsal view (male); 379, same (female); 380, female genitalia, ventral view; 381, male pygofer, posterior view; 382, male pygofer, valve and subgenital plate, left lateral view; 383, aedeagus, dorsal view in direction of arrow in fig. 384; 384, aedeagus, left lateral view; 385, aedeagus, posterior view in direction of arrow in fig. 384; 386, connective, left lateral view; 387, left subgenital plate, ventral view; 388, male pygofer, dorsal view; 389, left style, dorsal view; 390, connective, anterodorsal view; 391, abdominal apodemes, dorsal view; 392, left style, left lateral view. Scale as in figs. 1–16.

medial one, yellow, all three, together with vertex on each side of midline, rarely reddish or orange, the outer two often appearing to continue to apex of vertex; scutellum cream with disc in parts and basal angles yellow; remainder of thorax with dorsum dark brown, venter pale stramineous. Legs pale stramineous. Fore wings with basal area subhyaline greenish yellow, usually pale; apical half hyaline with veins creamish. Hind wings hyaline, veins dark brown. Abdomen with dorsum dark brown to black, lateral edge yellow or cream; venter yellow, usually pale, often cream in female; male pygofer and anal tube light brown, occasionally dark brown, valve and subgenital plates concolorous cream; female pygofer cream with dorsum and apex of ovipositor beyond pygofer dark brownish, sternum VII cream with medial emargination edged with brown.

Male apodemes elongate, narrow, each with length approximately 3½–4 times width, usually divergent, rarely parallel, extending to anterior region of fifth segment.

Male genitalia with pygofer tapering posteriorly in lateral aspect and terminating dorsoposteriorly in a stout process curving abruptly anteromesally and slightly dorsally, its dorsal and ventral surface with a row of apposed ridge-like teeth; dorsolateral margin with a small number of spine-like setae near midlength; lateral surface with numerous setae over posterior half. Aedeagus with preatrium short; basal apodeme well developed, directed dorsally and expanding towards apex; shaft elongate, directed dorsoposteriorly with distal third turned slightly more dorsad and terminating in a pair of anteriorly directed flap-like processes, each with a short spur-like process laterally; a pair of short lateral parallel processes near midlength, directed anteriorly; gonopore on posterior margin level with lateral processes.

Female genitalia with posterolateral angles of sternum VII rounded, posterior margin broadly concave with edge of concavity heavily sclerotized.

Distribution. Ontario (Phillips, 1951*a*), Minnesota (Medler, 1943*a*), Iowa (Padley, 1941*a*), Illinois (McAtee, 1926*c*), Ohio (Johnson, 1935*a*), Kansas (Lawson, 1930*c*; Ball & DeLong, 1925*a*), Kentucky (Young, 1949), Tennessee (Ball & DeLong, 1925*a*), North Carolina (Brimley, 1938*a*), South Carolina (Ball & Delong, 1925*a*), Georgia (Fattig, 1955*a*), Texas (Ball & DeLong, 1925*a*), Mexico (McAtee, 1926*b*).

Specimens seen. CANADA: Ont., Pt. Pelee, 2 ♂, 9.ix.1954 (*W. R. M. Mason*); Ont., Portsmouth, 1 ♀, 29.iv.34 (*J. S. Caldwell*). UNITED STATES: Wis., Eagleton, 1 ♂, 29.viii.37 (*R. H. Beamer*); Wis., Blue River, 1 ♀, 28.vii.16 (*D. M. DeLong*); Wis., Amery, 1 ♀, 13.viii.16 (*D. M. DeLong*); Ill., Orland Park, 2 ♀, 13.vii.1946 (*R. H. Beamer*); Ill., Karnak, 1 ♀, 14.vi.1954 (*DeLong & Ross*); Ill., Onarga, 1 ♂, 13.vii.1946 (*R. H. Beamer*); Ill., Urbana, 1 ♂, 14.vii.1946 (*R. H. Beamer*), 2 ♀, 19.ix.1934 (*DeLong & Ross*); Pa., Speeceville, 1 ♀, 22.vii.17 (*J. G. Sanders*); Pa., Penfield, 1 ♀, 24.viii.18 (*J. G. Sanders*); Pa., Landisburg, 1 ♀, 11.vii.18 (*J. G. Sanders*); Pa., Proctor, 1 ♀, 21.vii.18 (*J. G. Sanders*); N. J., Allenhurst, 1 ♂, 2 ♀, 20.vi.19 (*J. G. Sanders*); D. C., 1 ♂, 19.x.39 (*no collector*); D. C., Washington, 2 ♀, 3.vii.19, 1 ♀, 4.xi.06, 1 ♀, 24.x.06, 2 ♀, 25.x.06 (*J. G. Sanders*), 1 ♂, 6.v.34, 1 ♂, 22.ii.32 (*P. W. Oman*); Md., Marshall Hall, 1 ♂, 9.vii.05 (*J. G. Sanders*); Md., Beltsville, 1 ♂, 2 ♀, 21.iv.44 (*G. B. Sartoris*); Md., Plummers Id., 3 ♂, 3 ♀, 25.viii.43, 3 ♂, 1 ♀, 28.viii.43 (*R. H. Beamer*); Md., Ocean City, 1 ♀, 18.vi.18 (*J. G. Sanders*); Va., Arlington, 7 ♂, 1.viii.43, 5 ♂, 5 ♀, 12.ix.43 (*R. H. Beamer*); Va., Battle Pt., 2 ♀, 22.vi.18 (*J. G. Sanders*); Va., Dismal Swamp, 2 ♂, 13.viii.34 (*R. H. Beamer*); Va., Mt. Lake, 2 ♂, 2 ♀, 2.ix.1946 (*R. H. Beamer*); Va., Cp. Charles, 1 ♀, 1.viii.20, 1 ♀, 3.viii.20 (*D. M. DeLong*); Va., Norfolk, 1 ♂, 8.x.32 (*L. D. Anderson*); N. C., Crusoe, 1 ♂, 1 ♀, viii.35 (*Z. P. Metcalf*); N. C., mountains, 1 ♂, 5 ♀, 1937–1938 (*Z. P. Metcalf*); N. C., The Cliffs State Park, 1 ♂, 27.vii.1957, 1 ♀, 30.iv.1959 (*D. A. Young*); N. C., Whiteside Mt., 1 ♂, 6.vi.1957 (*D. A. Young*); N. C., Mt. Airy, 1 ♀, 4.ix.1941 (*R. C. Peeples*); N. C., Sampson Co., 1 ♂, 27.v.1957 (*D. A. Young*); N. C., Morrow Mtn. State Park, 1 ♂, 1 ♀, 20.vi.1958 (*D. A. Young*), 1 ♀, 22.vii.59 (*F. W. Mead*); N. C., Swannanoa, 1 ♂, 1 ♀, 13.viii.1919, 2 ♂, 2 ♀, 29.viii.1919, 1 ♀, 16.viii.1919 (*Osborn & Metcalf*); N. C., Wake Co., 2 ♂, 3 ♀, 23.v.1958 (*D. A. Young*); N. C., Highlands, 3 ♂, 2 ♀, 7.vi.1957, 1 ♀, 5.vi.1957 (*D. A. Young*); N. C., Haywood Co., 4 ♂, 2 ♀, 20.vii.1958 (*D. A. Young*); N. C., Swain Co., 2 ♂, 1 ♀, 28.vii.1958 (*D. A. Young*); N. C., Mt. Pisgah, 1 ♀, 14.viii.1957, 2 ♂, 3 ♀, 17.vii.1958, 1 ♀, 18.vii.1959, 1 ♀, 18.vi.1958, 1 ♂, 18.vii.1958, 2 ♂, 4 ♀, 15.viii.1957 (*D. A. Young*); N. C., Raleigh, 2 ♂, 6 ♀, x.1911 (*no collector*), 1 ♂, 31.viii.1946 (*L. D. Beamer*), 1 ♂, 15.vi.1957 (*D. A. Young*); N. C., Crabtree Meadows Park, 3 ♀, 29.vii.1958 (*D. A. Young*); N. C., Cedar Mt., 1 ♀, 15.viii.1957 (*D. A. Young*); N. C., Robbinsville, 3 ♂, 5 ♀, 24.vii.1958, 1 ♀, 28.vii.1958 (*D. A. Young*); N. C., Graham Co., Hooper bald, 3 ♂, 27.vii.1958 (*D. A. Young*); N. C., Graham Co., 4 ♂, 5 ♀, 28.vii.1958 (*D. A. Young*); Tenn., Hamilton Co., 2 ♂, 1 ♀, 22.x.40 (*W. F. Turner*); Tenn., Byersburg, 1 ♀, 17.vi.15 (*no collector*); Tenn., Clarksville, 2 ♂, 23.vi.15 (*no collector*), 1 ♂, 4.vii.39 (*J. D. Beamer*), 1 ♂, 15.vii.1939 (*R. H. Beamer*); N. C. and Tenn., Roan Mt., 5,500′–6,300′, 1 ♂, 2 ♀, 1/3.ix.1927 (*Z. P. Metcalf*); Ga., Cornelia, 1 ♀, vi.18 (*D. M. DeLong*); Ala., Elgin, 3 ♂, 6.vii.1939 (*R. H. Beamer*); Ark., Fayetteville, 1 ♂, 20.x.1937 (*M. W. Sanderson*); Okla., Alfalfa Co., 1 ♂, 2 ♀, 3.x.1948, 1 ♀, 9.vi.1948, 1 ♂, 23.x.1948, 1 ♀, 5.v.1949 (*S. Coppock*); Kans., Hamilton Co., 3,350′, 1 ♂, vii.1921 (*no collector*); Kans., Douglas Co., 1 ♂, 21.vi.1928, 4 ♂, no date (*P. B. Lawson*), 1 ♂, 26.x.1944 (*R. H. Beamer*); Kans., Pratt Co., 1,900′, 1 ♂, vi.1921 (*no collector*); Kans., Scott Co., S. Pk., 1 ♀, 9.viii.45 (*R. H. Beamer*); Kans., Leavenworth Co., 1 ♂, 6.v.39 (*D. E. Hardy*); Kans., Cherokee Co., 1 ♂, 20.iv.35, 1 ♂, 30.viii.39, 2 ♂, 5 ♀, 18.ix.1945, 1 ♀, 19.ix.45 (*R. H. Beamer*); Kans., Lawrence, 4 ♂, 14.v.39 (*L. Lipovsky*); Kans., La Cygne, 2 ♂, 12.x.1948, 1 ♂, 14.x.1948, 1 ♂, 20.x.1948 (*R. H. Beamer*); Mo., Hollister, 1 ♀, 22.vii.1915 (*H. H. Knight*); Texas, San Antonio, 4 ♂, 25.vi.38 (*R. H. Beamer*); Texas, Dallas, 2 ♂, 5.xii.1945 (*R. H. Beamer*); Texas, Sarita, 1 ♀, 25.xii.1945 (*R. H. Beamer*); Texas, Crosby, 1 ♂, 27.iv.1953 (*R. H. Beamer*); Colo., Holly, 2 ♂, 6.ix.38 (*D. E. Hardy*).

New Records: Pennsylvania, New Jersey, District of Columbia, Maryland, Virginia, Alabama, Wisconsin, Arkansas, Oklahoma, Colorado, Missouri.

Of the original type series, seventeen specimens present in the DeLong Collection, Ohio State University, (UNITED STATES: Tenn., Knoxville, 204, 2 ♂, 1 ♀, 13.ix.15 (*no collector*); Tenn., Clarksville, 115, 2 ♂, 1 ♀, 14.vii.15 (*no collector*); Tenn., Clarksville, 109, 1 ♂, 9.vii.15 (*no collector*); Tenn., Clarksville, 108, 1 ♂, 6.vii.15 (*no collector*); Tenn., Clarksville, 100, 2 ♀, 5.vii.15 (*no collector*); Tenn., Clarksville, 116, 1 ♀, 14.ix.15 (*no collector*); Tenn., Clarksville, 183, 1 ♀, 25.x.15 (*no collector*); Tenn., Clarksville, 1 ♀, 31.x.15 (*D. M. DeLong*); Tenn., Knoxville, 2 ♀, 13.ix.15 (*D. M. DeLong*); Tenn., Knoxville, 206, 1 ♀, 13.ix.15 (*no collector*); Tenn., Memphis, 45, 1 ♀, 21.vi.15 (*no collector*)) were also studied. Of these specimens, the male labelled "Clarksville, Tenn., 7–6–15 108" is here designated as LECTOTYPE and the remaining specimens as PARALECTOTYPES.

Biology. *Dikraneura angustata* is active from early spring to late summer and is recorded during May in Illinois (McAtee, 1926*c*), Ohio (Johnson, 1935*a*) and Kentucky (Young, 1949) and even as early as April in Georgia (Fattig, 1955*a*). Specimens at hand show it to be present during April also in Ontario, Maryland, North Carolina, Kansas and Texas and even as early as February in District of Columbia. Its latest recorded appearance is October in Ohio (Johnson, 1935*a*) and North Carolina (Brimley, 1938*a*) and present specimens indicate this month also for District of Columbia, Virginia, North Carolina, Tennessee, Arkansas, Oklahoma and Kansas. Specimens are also at hand for November in District of Columbia and December for Texas. McAtee (1926*c*) records it on Locust in Illinois while Phillips (1951*a*) gives its hosts as grasses in Sour Cherry orchards in Ontario.

Remarks. *Dikraneura angustata* is closely related to the following species, *D. torta* DeLong & Caldwell, especially in the shape of the male genitalia. *D. angustata*, however, may be distinguished by the shorter and more robust form of the pygofer with the posterior processes stouter, and the teeth more ridge-like and closer together rather than separate and distinct. The aedeagus is also relatively shorter, less tapered in posterior aspect, with the apical flap-like processes more broadly rounded in lateral aspect and with the gonopore level with rather than basad of lateral processes. The two species are further distinguished by the shorter, relatively narrower and more divergent abdominal apodemes in *D. angustata*. Externally, the two species are easily distinguished by the larger size of *D. torta*, the difference in colouration and the shape of the head and pronotum.

D. angustata is similar externally to *D. abnormis* (Walsh) but is smaller, with the apex of the vertex more obtusely angled and with slightly different colouration. The male genitalia of both species are distinct.

Dikraneura torta DeLong & Caldwell

(Text-figs. 393–407)

Dikraneura (*Notus*) *torta* DeLong & Caldwell, 1937*a* : 25.

Length: ♂ 3·70–4·00 mm. (mean 3·77 mm.). ♀ 3·76–3·96 mm. (mean 3·90 mm.).

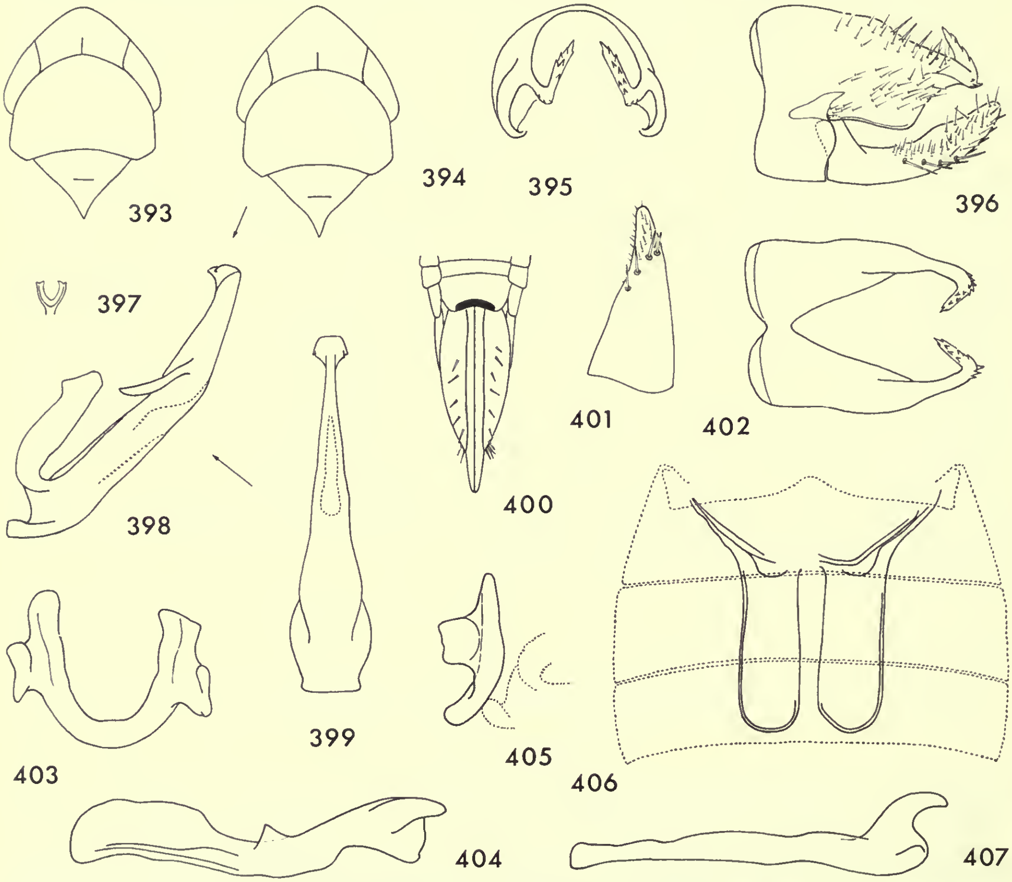
Head with width greater than that of pronotum, vertex moderately produced with apex broadly rounded in dorsal aspect, more markedly produced and acutely rounded in female, medial length approximately 1½ times length next eyes, broadly rounded to face with latter as long as wide, ocellocular area equal in width to antennal fossa; pronotum with sides parallel.

Colour of face sordid yellow or cream, lora, genae and vertex cream, eyes testaceous. Pronotum cream, disc sordid pale pinkish, with three faintly indicated longitudinal vittae, one medial and one over each lateral edge of disc, yellowish, the outer two rarely extending onto vertex; scutellum cream with basal angles and disc anterior to transverse suture, yellow; remainder of thorax pale yellowish or creamish. Legs pale stramineous. Fore wings with basal area subhyaline pale orange, rarely pale greenish yellow, with internal edge of clavus, claval vein, claval suture and *Cu* and *M* to base of apical cells, whitish; apical half hyaline, faintly smoked with brown, veins creamish. Hind wings hyaline, veins dark brown. Male abdomen with dorsum dark brown, lateral margin yellow, venter yellow, pygofer pale brown with subgenital plates cream; female abdomen uniformly pale yellowish or creamish with edge of medial emargination of sternum VII light brown.

Male apodemes elongate, each with length approximately 2½ times width, extending to posterior region of fifth segment.

Male genitalia as in *D. angustata* Ball & DeLong but with pygofer more elongate, pygofer process more slender and with teeth much smaller and restricted to elbow and recurved portion, and the aedeagus more elongate, more tapered in posterior aspect and with apical flap-like processes more acute, apical spur-like processes smaller and lateral processes distad of gonopore.

Female genitalia with sternum VII as in *D. angustata* Ball & DeLong but relatively wider.



FIGS. 393–407. *Dikraneura torta* DeLong & Caldwell. 393, head, pronotum and scutellum, dorsal view (male); 394, same (female); 395, male pygofer, posterior view; 396, male pygofer, valve and subgenital plate, left lateral view; 397, apical processes of aedeagus, dorsal view in direction of arrow in fig. 398; 398, aedeagus, left lateral view; 399, aedeagus, posteroventral view in direction of arrow in fig. 398; 400, female genitalia, ventral view; 401, left subgenital plate, ventral view; 402, male pygofer, dorsal view; 403, connective, anterior view; 404, left style, dorsal view; 405, connective, left lateral view; 406, abdominal apodemes, dorsal view; 407, left style, left lateral view. Scale as in figs. 1–16.

Distribution. Arizona (DeLong & Caldwell, 1937*a*).

Specimens seen. UNITED STATES: Ariz., Mt. Lemon, 1 ♂, 4 ♀, 29.iv.1948 (*R. H. Beamer*).

The holotype ♂ and 1 ♂ paratype (UNITED STATES: Ariz., Chiricahua Mts., 9.vi.33 (*R. H. Beamer*)), located in the Snow Museum, University of Kansas, and 1 ♂ paratype (same data), located in the DeLong Collection, Ohio State University, were also studied. The male paratype in the Snow Museum is abnormal, possibly parasitized.

Biology. Restricted to Arizona, *D. torta* has been previously recorded only during June (DeLong & Caldwell, 1937*a*). Present specimens show it to be present also during April.

Remarks. Although *D. torta* is larger and less slender than *D. angustata* Ball & DeLong and differs also in colouration and the shape of the head and pronotum, making them easily distinguishable externally, the two species are closely related on the basis of the male genitalia. The latter are sufficiently distinct, however, to permit recognition and are discussed under *D. angustata*.

The restriction of *D. torta* to Arizona, compared with the widespread distribution of *D. angustata* Ball & DeLong over the eastern half of the United States, suggests that *D. torta* may be a subspecies of the latter. In view of their marked external differences, however, and the absence of a longer series of *D. torta* preventing a more critical study, they are here considered as distinct species.

Dikraneura arcta DeLong & Caldwell

(Text-figs. 408–413)

Dikraneura (*Notus*) *arcta* DeLong & Caldwell, 1937*a* : 29.

Length: ♂ 3·20 mm.

Head with width equal to that of pronotum, vertex angularly produced with medial length approximately twice length next eyes, apex narrowly rounded in dorsal aspect; pronotum with width increasing posteriorly.

Colour of head yellow, paling laterally over genae to cream. Pronotum cream with a longitudinal vitta on each side of midline and a much narrower medial one, pale yellow; scutellum cream with basal angles and medial area pale yellow; remainder of thorax yellowish. Legs cream. Fore wings with basal area pale greenish yellow opaque; apical area hyaline. (Colour of abdomen not obtainable).

Male apodemes elongate, length of each 3 times width, divergent, extending to posterior margin of fifth segment.

Male genitalia as in *D. angustata* Ball & DeLong but with pygofer more elongate, posterior processes more slender, directed more anteriorly and with teeth smaller and restricted to recurved portion and with aedeagus straight, tapering distally and with lateral processes markedly distad of gonopore and diverging anterolaterally. (Apex of aedeagus missing in holotype).

Female unknown.

Distribution. Arizona (DeLong & Caldwell, 1937*a*).

Specimens seen. Holotype ♂, UNITED STATES: Ariz., Red Lake, 5.viii.33 (*R. H. Beamer*), in Snow Museum, University of Kansas.

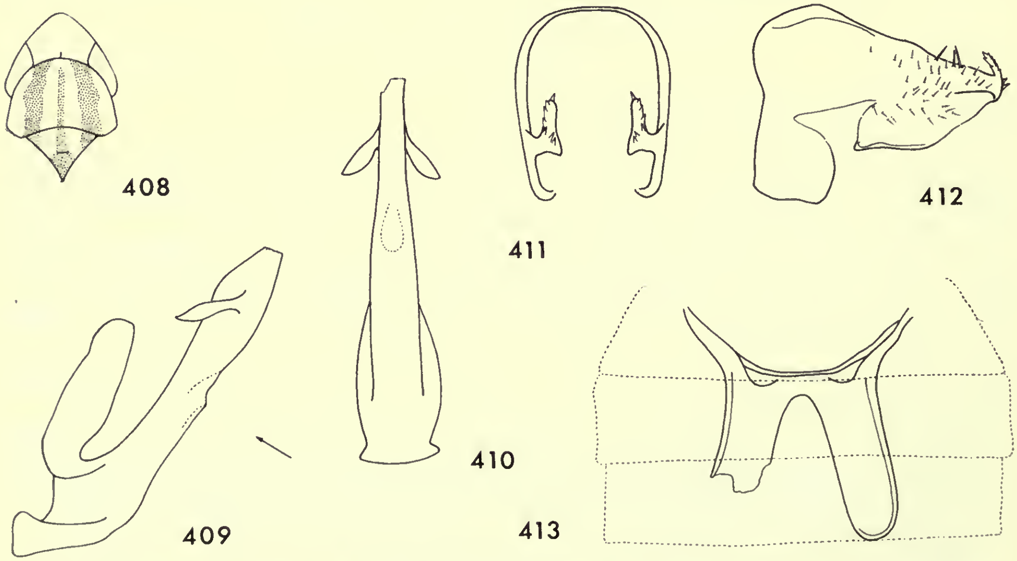
Biology. *Dikraneura arcta* is known only by its holotype, taken during August in Arizona (DeLong & Caldwell, 1937*a*).

Remarks. The exact shape of the aedeagus in *Dikraneura arcta* is not known since the apex in the only available specimen (the holotype) is broken off. The original description of the aedeagus possessing a "bluntly pointed tip" is therefore incorrect.

Dikraneura arcta is closely related to *D. angustata* Ball & DeLong in the general shape of the aedeagus and pygofer as well as the elongate divergent abdominal apodemes, the shape of the vertex and the presence of lateral and medial vittae on the pronotum. *D. arcta* differs, however, in having the lateral processes of the aedeagus markedly distad of the gonopore and directed anterolaterally, rather than level with the gonopore and directed anteriorly, and the posterior processes of the pygofer more elongate and recurved anteriorly rather than anteromesally, with the teeth relatively smaller and more isolated from one another.

In the position of the lateral processes of the aedeagus, as well as the shape and ornamentation of the pygofer processes, *D. arcta* is more similar to *D. torta* DeLong & Caldwell, the other species closely related to *D. angustata* Ball & DeLong. It differs from *D. torta* however in having the aedeagus straight, rather than turned dorsad over its apical half, the lateral processes directed anterolaterally rather than anteriorly, and the abdominal apodemes divergent, as well as in overall size, the shape of the vertex and the presence of the longitudinal vittae on the pronotum.

Further specimens are necessary before the true relationship between these three species can be assessed. At the moment *D. arcta* and *D. torta* DeLong & Caldwell



FIGS. 408–413. *Dikraneura arcta* DeLong & Caldwell. 408, head, pronotum and scutellum, dorsal view; 409, aedeagus, left lateral view; 410, aedeagus, posterior view in direction of arrow in fig. 409; 411, male pygofer, dorsoposterior view; 412, male pygofer and valve, left lateral view; 413, abdominal apodemes, dorsal view. Scale as in figs. 237–242.

are known from only one and three males respectively, taken in Arizona, compared with the widely distributed *D. angustata* Ball & DeLong.

Dikraneura ardea Ruppel & DeLong

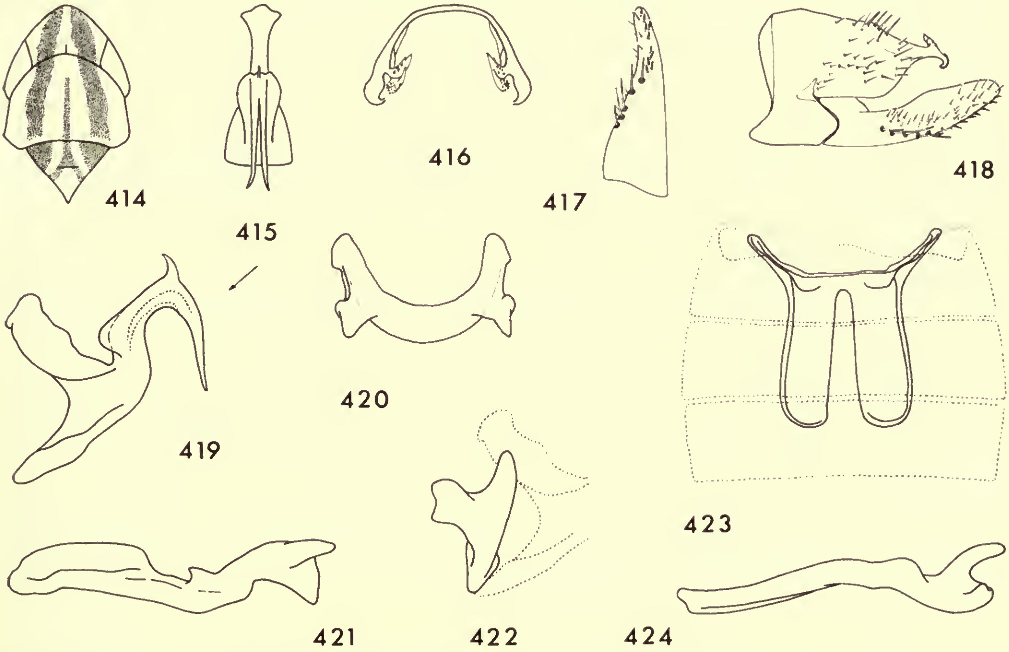
(Text-figs. 414–424)

Dikraneura ardea Ruppel & DeLong, 1953*e* : 350.

Length: ♂ 3·60–4·20 mm. (mean 3·90 mm.).

Head with width approximately equal to or slightly narrower than that of pronotum, vertex moderately produced with apex broadly or narrowly rounded in dorsal aspect, medial length 1½ times length next eyes, broadly rounded to face with latter slightly longer than wide, ocell-ocular area equal in width to antennal fossa; pronotum with width increasing only slightly posteriorly.

Colour of face pale brownish washed with yellow, lora and genae cream, eyes testaceous; vertex and pronotum cream with a longitudinal vitta on each side of midline, from apex of vertex to posterior margin of pronotum, and a much narrower medial one over pronotum, red or orange; disc of pronotum sordid pale pinkish. Scutellum cream with basal angles and a medial streak, bifurcating posteriorly over transverse suture, orange; remainder of thorax with dorsum dark brown, venter pale stramineous. Legs pale stramineous. Fore wings with basal



FIGS. 414–424. *Dikraneura ardea* Ruppel & DeLong. 414, head, pronotum and scutellum, dorsal view; 415, aedeagus, dorsoposterior view in direction of arrow in fig. 419; 416, male pygofer, posterior view; 417, left subgenital plate, ventral view; 418, male pygofer, valve and subgenital plate, left lateral view; 419, aedeagus, left lateral view; 420, connective, anterior view; 421, left style, dorsal view; 422, connective, left lateral view; 423, abdominal apodemes, dorsal view; 424, left style, left lateral view. Scale as in figs. 1–16.

area subhyaline greenish yellow or red, claval vein, claval suture and *Cu* to base of apical cell, whitish; apical half hyaline, pale smoky brown, veins yellowish cream. Hind wings hyaline, veins dark brown. (Colour of abdomen not obtainable).

Male apodemes elongate, each with length 2–3 times width, extending to near middle of fifth segment.

Male genitalia with pygofer as in *D. angustata* Ball & DeLong but more elongate, with posterior processes much smaller and more slender and with recurved portion and ventrally produced elbow with much smaller teeth. Aedeagus with preatrium poorly developed; basal apodeme well developed, directed anterodorsally; shaft relatively short, directed dorsally at base and then strongly arched posteriorly and finally ventrally terminating in a pair of elongate processes directed ventrally in line with shaft, the entire structure appearing more or less S-shaped in lateral aspect; a short acute process medially on dorsal surface of shaft just before apex, directed dorsally; a pair of short thin plate-like lobes anterolaterally near base of shaft, directed anteriorly, their bases long and extending along approximately one-third length of shaft; gonopore apical between bases of apical processes.

Female unknown.

Distribution. Mexico (Ruppel & DeLong, 1953*e*).

Specimens seen. MEXICO: Vera Cruz, 9 miles N.W. Jalapa, 1 ♂, 31.xii.1949 (*R. H. Beamer*). This specimen was originally designated as a paratype of *D. beameri* Borland and is located in the Snow Museum, University of Kansas.

The holotype ♂ (MEXICO: Mich., Zamora, 2.x.1941 (*DeLong, Good, Caldwell & Plummer*)), located in the DeLong Collection, Ohio State University, was also studied.

Biology. *Dikraneura ardea* has been previously recorded only once, during October in Mexico where it is apparently restricted to the pine regions of the higher altitudes (Ruppel & DeLong, 1953*e*). Specimens at hand indicate its presence also in December.

Remarks. *Dikraneura ardea* is similar in external appearance to the majority of other species of the genus found in Mexico but may be distinguished by the additional medial stripe along the pronotum and by the unique S-shaped aedeagus. *D. angustata* Ball & DeLong, which extends south into Mexico and resembles *D. ardea* in general shape and size and by the presence of a medial stripe on the pronotum, may be distinguished from the present species by being slightly smaller, having the longitudinal vittae usually yellow rather than red and above all by the male genitalia.

Although unique in the shape of the aedeagus, *D. ardea* is seen to be related to the majority of other species occuring in Mexico and the southwestern area of the United States by the shape of the male pygofer.

Dikraneura robusta Lawson

(Text-figs. 425–439)

Dikraneura robusta Lawson, 1930*e* : 41.
Dikraneura lentus DeLong, 1938*b* : 218. **syn. n.**
Dikraneura lentana DeLong [n.n. for *lentus* DeLong (homonym)], 1944 : 272.

Length: ♂ 3·60–3·86 mm. (mean 3·74 mm.). ♀ 3·94–4·64 mm. (mean 4·30 mm.).

Head with width greater than that of pronotum, vertex of uniform length or only slightly produced with medial length 1¼ times length next eyes in male, apex broadly rounded in dorsal aspect, moderately produced in female with medial length 1½ times length next eyes, broadly rounded to face with latter wider than long, frontoclypeus slightly tumid and ocellocular area 1½ times width of antennal fossa; pronotum with width increasing only very slightly posteriorly or sides parallel.

Colour of head pale brownish or orange-yellow, paling slightly over vertex to sordid cream along posterior edge, marginal sutures orange, lora and genae whitish cream with pit near centre of latter dark brown; anteclypeus pale yellow; eyes testaceous. Pronotum whitish cream overlaid on anterior half with sordid pale yellow, disc sordid; scutellum yellow; remainder of thorax dark brown marked laterally with yellow. Legs pale stramineous. Fore wings with clavus, cubital cell and basal area of costal margin subhyaline pale greenish yellow or whitish; apical half hyaline, with extreme apex smoky pale brown, veins whitish. Hind wings hyaline, veins dark brown. Abdomen with dorsum dark brown to black, lateral edge usually yellow, venter dark brown to black, sternites with posterior and occasionally lateral edge yellow; male pygofer and anal tube dark brown, valve brown to dark brown occasionally cream, subgenital plates cream; female pygofer pale yellow or creamish with dorsum and apex of ovipositor beyond pygofer dark brown, sternum VII pale yellowish or creamish.

Male apodemes elongate, each with length approximately 2½ times width, extending to middle of fifth segment.

Male genitalia with pygofer large and elongate, without processes but with posterior margin expanded as a large thick posteriorly directed lobe, its length approximately equal to one-third total length of pygofer; dorsolateral margin with a group of spine-like setae near mid-length; lateral surface with numerous long hair-like setae over medial area to base of posterior lobe. Subgenital plates with uniseriate row of spine-like setae along ventrolateral margin of uniform length, extending round apex. Aedeagus with preatrium absent; basal apodeme well developed, directed dorsally; shaft elongate, directed posterodorsally and terminating in two pairs of apical processes, a narrow elongate posterior pair directed posteriorly and then anteroventrally parallel to shaft, their apices turned slightly laterad, and a slightly larger anterior pair directed dorsoposteriorly in line with shaft and then abruptly dorsally and slightly laterally, their apices strongly divergent and turned laterad; gonopore apical between bases of apical processes.

Female genitalia with posterolateral angles of sternum VII broadly rounded, posterior margin straight or slightly concave medially with base of concavity rarely produced.

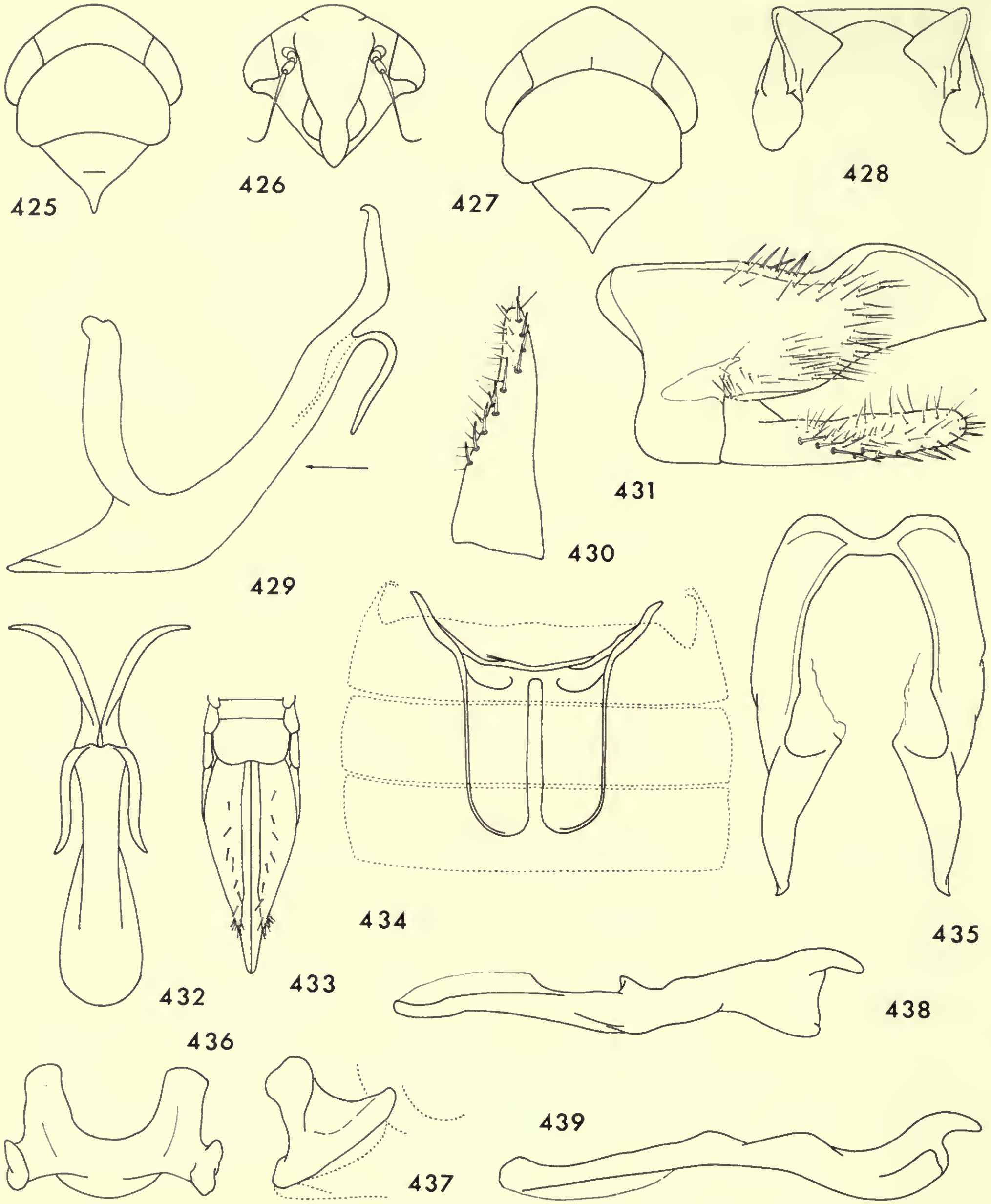
Distribution. Colorado (Lawson, 1930*e*), Arizona (DeLong, 1938*b*), New Mexico (Beamer, 1943*b*).

Specimens seen. UNITED STATES: Colo., Pingree Park, 1 ♂, 5 ♀, 18.viii.32 (*P. B. Lawson*); N. M., Chama, 5 ♂, 5.vii.37 (*C. L. Johnston*), 11 ♀, 5.vii.1937 (*L. D. Tuthill*); Ariz., Flagstaff, 8 ♂, 1 ♀, 8.vii.41 (*R. H. Beamer*).

The holotype ♂ (UNITED STATES: Colo., Creede, 8,844′, viii.1914 (*no collector*)), in the Snow Museum, University of Kansas, was studied. The allotype ♀, 18 ♂, 33 ♀ parallotypes (UNITED STATES: N. M., Chama, 5.vii.37 (*C. L. Johnston*)) and 1 ♀ parallotype (UNITED STATES: Colo., Creede, 6.vii.37 (*R. H. Beamer*)), also in the Snow Museum, were not listed in the original description.

The holotype ♂, allotype ♀ and 29 ♂, 25 ♀ paratypes (UNITED STATES: Ariz., Santa Rita Mts., White Mts., 5.vii.35 (*F. H. Parker*)) of *D. lentana* DeLong, located in the DeLong Collection, Ohio State University, were also studied.

Biology. *Dikraneura robusta* has been recorded during July in Arizona (DeLong, 1938*b*) and New Mexico (Beamer, 1943*b*) and August in Colorado (Lawson, 1930*e*),



FIGS. 425–439. *Dikraneura robusta* Lawson. 425, head, pronotum and scutellum, dorsal view (male); 426, face; 427, head, pronotum and scutellum, dorsal view (female); 428, male pygofer, posterior view; 429, aedeagus, left lateral view; 430, left subgenital plate, ventral view; 431, male pygofer, valve and subgenital plate, left lateral view; 432, aedeagus, posterior view in direction of arrow in fig. 429; 433, female genitalia, ventral view; 434, abdominal apodemes, dorsal view; 435, male pygofer, dorsal view; 436, connective, anterodorsal view; 437, connective, left lateral view; 438, left style, dorsal view; 439, left style, left lateral view. Scale as in figs. 1–16.

having been taken in the latter state at an elevation of 8,844′. Data from specimens at hand substantiate these records.

Remarks. *Dikraneura robusta* is similar to *D. triangulata* sp. n. in both colour and the shape of the vertex and face, the latter being unusual for the genus and found, to a lesser degree, in only one other species, *D. latacephala* Beamer. *D. robusta*, however, is much smaller than *D. triangulata* and with distinctly different male genitalia indicating the absence of any close relationship between the two species.

D. mali (Provancher) is the only other species without posterior processes on the pygofer but the rest of the genitalia show no evident relationship to those of *D. robusta* indicating the independent loss of the processes in each case.

The shape of the aedeagus of *D. robusta* is of the same general form to that found in *D. variata* Hardy, *D. ossia* Beirne, *D. shoshone* DeLong & Caldwell and related, species although the pygofer, abdominal apodemes and head set it apart from any of these species. In spite of the unique pygofer, it is perhaps most closely related to *D. latacephala* Beamer on the basis of the face in particular and the shape of the abdominal apodemes and aedeagus.

Dikraneura mali (Provancher)

(Text-figs. 440–453)

Erythroneura mali Provancher, 1890*a* : 298.
Dicraneura communis Gillette, 1898*a* : 718.

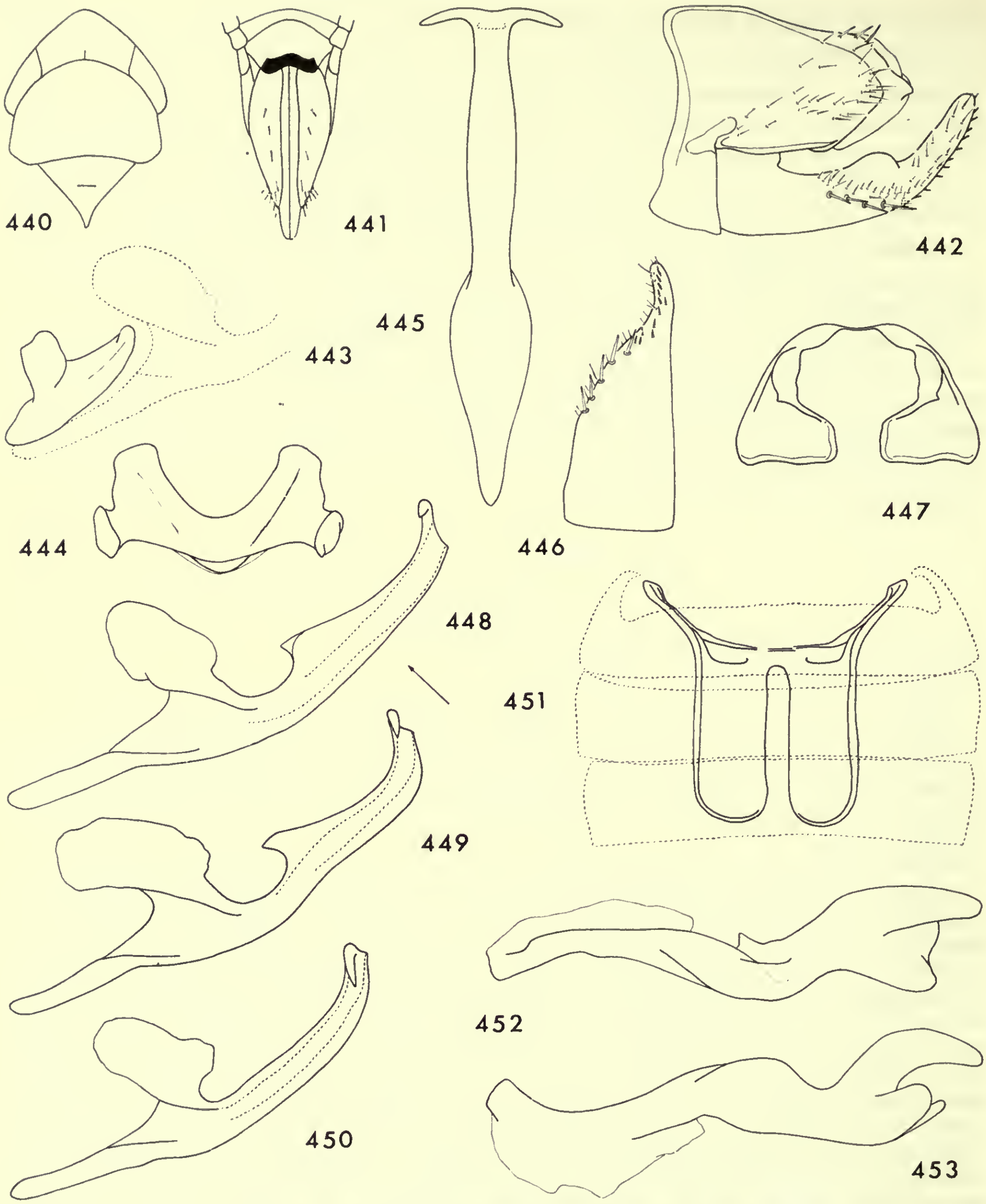
Length: ♂ 3·54–4·02 mm. (mean 3·82 mm.). ♀ 3·58–4·22 mm. (mean 3·97 mm.).

Head with width greater than that of pronotum, vertex angularly produced with apex rounded in dorsal aspect, medial length approximately $1\frac{1}{2}$ times length next eyes, narrowly or broadly rounded to face with latter approximately as long as wide, ocellocular area equal to or slightly wider than antennal fossa; pronotum with width increasing only slightly posteriorly or parallel sided.

Colour of head cream, paling laterally over genae to whitish cream, frontoclypeus below level of antennae usually and anteclypeus sometimes pale yellowish or brownish, marginal sutures and two small patches on vertex, one on each side of midline just behind apex, pale yellowish and sometimes indistinct; eyes testaceous. Pronotum whitish cream, disc sordid, a large patch over anterior two-thirds on each side of midline, yellowish and sometimes indistinct; scutellum whitish cream, basal angles yellow; remainder of thorax dark brown marked laterally with yellow. Legs pale stramineous. Fore wings with basal area subhyaline greenish yellow, usually very pale; apical half hyaline with extreme apex smoky pale brown, veins whitish. Hind wings hyaline, veins whitish. Abdomen with dorsum dark brown to black, lateral edge along entire length or on posterior segments only, yellow, venter dark brown to black with posterior and sometimes also lateral edge of sternites yellow, entire venter often pale yellow; male pygofer and anal tube brown to dark brown, former sometimes paling ventrally, valve and subgenital plates concolorous cream, occasionally yellow and sometimes washed with orange, rarely smoky; female pygofer cream with dorsum and apex of ovipositor beyond pygofer dark brown, sternum VII cream with posterior margin brown.

Male apodemes elongate, each with length approximately twice width, extending to near posterior margin of fifth segment.

Male genitalia with pygofer rounded posteriorly with dorsoposterior margin heavily sclerotized, ventroposterior margin converging medially, posterior margin produced medially in lateral aspect as a very short conical projection; dorsolateral margin with a small group of spine-like setae just distad of midlength; lateral surface with short hair-like setae over posterior half.



Figs. 440–453. *Dikraneura mali* (Provancher). 440, head, pronotum and scutellum, dorsal view; 441, female genitalia, ventral view; 442, male pygofer, valve and subgenital plate, left lateral view; 443, connective, left lateral view; 444, connective, anterodorsal view; 445, aedeagus, posteroventral view in direction of arrow in fig. 448; 446, left subgenital plate, ventral view; 447, male pygofer, posterior view; 448, aedeagus (Ames, Iowa), left lateral view; 449, same (Livingston Co., Michigan); 450, same (Keld, Manitoba); 451, abdominal apodemes, dorsal view; 452, left style, dorsal view; 453, left style, left lateral view. Scale as in figs. 1–16.

Subgenital plates much broader in ventral aspect than usual. Aedeagus with preatrium well developed; basal apodeme short, laterally compressed, oval in lateral aspect and directed anterodorsally; shaft elongate cylindrical, directed posterodorsally and terminating at anterior margin in a pair of short laterally directed processes, anterior margin usually acutely produced approximately one-third distance from base, projection sometimes rounded at apex and rarely absent; gonopore apical, immediately posterior to apical processes.

Female genitalia with lateral margins of sternum VII strongly convergent and broadly rounded to a broadly and moderately concave posterior margin, the latter heavily sclerotized.

Distribution. British Columbia (Downes, 1919*a*, 1927*a*), Alberta (Strickland, 1953*a*), Manitoba (Bird, 1930*a*), South Dakota (Severin, 1921*c*), Colorado (Gillette, 1898*a*; Ball & DeLong, 1925*a*), Minnesota (Medler, 1943*a*), Iowa (Ball & DeLong, 1925*a*; Padley, 1941*a*), Illinois (Gillette, 1898*a*; Ball & DeLong, 1925*a*; DeLong, 1948*a*), Wisconsin (Sanders & DeLong, 1917*a*; Ball & DeLong, 1925*a*), Michigan (Gillette, 1898*a*; Pettit, 1922*a*; Ball & DeLong, 1925*a*), Ontario (Phillips, 1951*a*), Ohio (Osborn, 1904*a*; Ball & DeLong, 1925*a*; Johnson, 1935*a*), Pennsylvania, (DeLong, 1923*b*; Ball & DeLong, 1925*a*), New York (Gillette, 1898*a*; Van Duzee, 1905*a*; Young, 1910*a*; Osborn, 1922*c*; Ball & DeLong, 1925*a*; Leonard, 1928*a*), Connecticut (Britton, 1920*a*; DeLong, 1923*a*; Ball & DeLong, 1925*a*), New Hampshire (Lowry, 1933*a*), Maine (Osborn, 1915*a*; Ball & DeLong, 1925*a*; Procter, 1946*a*), Quebec (Provancher, 1890*a*; Moore, 1907*a*, 1944*a*, 1950*a*), Nova Scotia (McAtee, 1918*b*).

Specimens seen. CANADA: Sask., Indian Head, 1 ♀, 6.ix.1929 (*K. Stewart*); Man., Keld, 2 ♂, 8.viii.37 (*R. H. Beamer*); Ont., Vineland, 4 ♂, viii.1922, 2 ♂, 10.ix.1922 (*W. Robinson*); Ont., Carp, 1 ♀, 20.v.1954 (*R. Hollinsworth*); Ont., Ottawa, 1 ♂, 1 ♀, 12.v.1955 (*L. A. Kelton*), 1 ♀, 5.v.1952 (*J. G. Chillcott*), 1 ♂, 5.iv.1950 (*R. deRuette*); Ont., Marmora, 3 ♀, 30.iv.1952 (*J. F. McAlpine*); Ont., Maynooth, 1 ♀, 4.ix.1953, 1 ♀, 6.ix.1953 (*B. P. Beirne*); Que., Kirks Ferry, 2 ♂, 2 ♀, 25.v.50 (*B. P. Beirne*); Que., Aylmer, 1 ♀, 19.v.1927 (*G. S. Whalley*); N .B., Fredericton, 1 ♂, 5.vi.1932 (*C. W. B. Maxwell*). UNITED STATES: Alaska, Livengood Rd. 6 miles, 1 ♂, 11.v.1951 (*J. M. Geary*); N. Colo., 1 ♀, 4.iii.98 (*no collector*); Minn., Two Harbors, 2 ♂, 14.viii.37 (*R. H. Beamer*); Minn., Aitkin, 1 ♂, 25.viii.33 (*P. B. Lawson*); Ia., Ames, Exp. Sta., 7 ♀, 12.v.97, 2 ♂, 4 ♀, 25.v.97, 1 ♀, 14.x.96, 1 ♀, 16.v.98 (*no collector*), 1 ♂, 21.vii.97 (*H. Osborn*); Ia., Ames, 1 ♀, 9.iv.08 (*R. I. W.*), 1 ♀, 23.iv.1924 (*no collector*), 1 ♀, 2.v.1947 (*J. Laffoon*), 1 ♀, 7.v.1951 (*U. L. Forney*), 1 ♀, 3.v.1952 (*W. Kwolek*); Ia., Boone Co., Ledges St. Pk., 1 ♀, 6.v.1958 (*D. H. Munger*); Ia., Mt. Pleasant, 1 ♀, 1.v.1933 (*C. Hall*), 1 ♀, 25.iv.1934 (*Knutson*); Wis., Fish Creek, 2 ♂, 14/24.viii.1926 (*P. B. Lawson*); Wis., St. Croix Falls, 6 ♀, 15.viii.16 (*J. G. Sanders*), 2 ♀, 15.viii.16 (*D. M. DeLong*); Wis., Marshfield, 3 ♀, 20.viii.16 (*D. M. DeLong*); Wis., Ladysmith, 2 ♀, 9.viii.16 (*D. M. DeLong*); Wis., Racine Co., 1 ♀, 19.v.1954 (*D. H. Habeck*); Wis., Bayfield, 1 ♀, 10.ix.16 (*D. M. DeLong*); Wis., Merrillan, 1 ♀, 5.viii.16 (*D. M. DeLong*); Wis., Amery, 1 ♀, 10.vi.17 (*E. D. Ball*); Wis., Madison, 1 ♀, 21.ix.17 (*E. D. Ball*); Mich., Douglas Lake, 2 ♂, 22.viii.37 (*R. H. Beamer*); Mich., 1 ♀, no date (*no collector*); Mich., Cedar River, 1 ♂, 26.viii.37 (*R. H. Beamer*); Mich., Gogebic, 1 ♂, 18.viii.37 (*R. H. Beamer*); Mich., Livingston Co., E. S. George Reserve, 1 ♂, 1 ♀, 24.v.1939, 1 ♂, 7.x.1937 (*I. J. Cantrall*); Mich., Washtenaw Co., Ann Arbor, 1 ♀, 20.v.1937 (*D. L. Cantrall*); Ohio, Barberton, 2 ♂, 23.vii.36 (*L. J. Lipovsky*); Pa., Tyrone, 1 ♂, 2 ♀, 26.vii.17 (*J. G. Sanders*); Pa., Kane, 1 ♀, 2.viii.19, 1 ♀, 23.viii.19 (*D. M. DeLong*); Pa., Landisburg, 1 ♀, 4.vii.18 (*J. G. Sanders*); Pa., Hartstown Bg., 1 ♂, 26.vi.19, 1 ♀, 12.viii.19, 2 ♀, 14.ix.19 (*D. M. DeLong*), 1 ♀, 12.viii.19, 1 ♀, 13.viii.19 (*Mrs. DeLong*); Pa., Ohio Pl., 1 ♀, 20.vii.19 (*D. M. DeLong*); Pa., N.E., 1 ♂, 24.vi.19 (*Mrs. DeLong*); Pa., Presque I., 1 ♀, 29.viii.19, 1 ♀, 21.vii.20 (*D. M. DeLong*), 5 ♀, 7.ix.20 (*J. G. Sanders*); Pa., Port Matilda, 1 ♀, 24.viii.18 (*J. G. Sanders*); Pa., Sta. College, 1 ♀, 25.vii.17 (*J. G. Sanders*); Pa., Greenfield, 1 ♀, 22.viii.20 (*D. M. DeLong*); Pa., Richfield, 1 ♀, 26.vii.18 (*J. G. Sanders*); N. Y., Fredonia, 2 ♂, 21.vii.46 (*L. D. Beamer*); N. Y., Cranberry Lake, 1 ♀, 19.vii.17 (*C. J. Drake*); Conn., Storrs, 1 ♂, 1 ♀, 9.viii.46 (*L. R. Penner*); Mass., Boston, Arnold Arboretum, 1 ♀, no date, (*no collector*); N. H., Bretton Woods, 1 ♂, 31.viii.34 (*R. H. Beamer*); Maine, Ft. Kent, 1 ♀, 28.viii.13 (*H. Osborn*).

New Records: Alaska, New Brunswick, Saskatchewan, Massachusetts.

The type series of *D. mali*, located in the Provancher Collection in Laval University, Quebec[5], was not studied. Van Duzee (1912*b*), in his study of the Provancher Collection, placed *D. communis* Gillette as a synonym of *D. mali*.

Part of the type series of *D. communis* Gillette, located in the U.S. National Museum, and consisting of 1 ♀ labelled[6] " 17904 " " Type " " Type No. 3415 U.S.N.M.", one specimen with abdomen missing labelled " Ithaca, N.Y., 31 July '94 " " Type " " Type No. 3415 U.S.N.M.", 1 ♀ labelled " Ag. Coll. Mich. 5–20 '92 168 " " Type " " Type No. 3415 U.S.N.M.", 1 ♀ labelled " Ag. Coll. Mich. 149 " "Collection C. F. Baker " " Type ", 1 ♀ labelled " Ag. Coll. Mich. 586 " " Collection C. F. Baker " " Type " " Dicraneura communis Gill." and 1 ♂ labelled " Ag. Coll. Mich. 205 " " Type " " Collection C. F. Baker " was studied. A further ♂ specimen of the type series labelled " 14873 " " Gillette Det. '95 4139 " " Type " " Type Dicraneura communis Gill." " Dikraneura communis Gill. Det. W. L. McAtee " " Paratype ♂ Dicraneura communis Gill.", located in the Illinois Natural History Survey Collection, was also studied. Of the above syntypes, the male labelled " Ag. Coll. Mich. 205 " " Type " " Collection C. F. Baker " is here designated as LECTOTYPE. It is located in the U.S. National Museum. The remaining specimens listed above are here designated as PARALECTOTYPES.

Gillette (1898*c*) in a list of original types of species in the Collections of the Colorado Agricultural College and Agricultural Experiment Station, lists 2 ♀ and 1 ♂ of *Dicraneura communis* Gillette. These specimens were not studied.

Biology. *Dikraneura mali* is a common species found from early spring to late summer. Its earliest recorded occurrence is during April in Illinois (Gillette, 1898*a*), Michigan (Gillette, 1898*a*), Connecticut (DeLong, 1923*a*), British Columbia (Downes, 1919*a*, 1927*a*), Ohio (Johnson, 1935*a*) and Minnesota (Medler, 1943*a*). This month is indicated also in specimens at hand from Iowa and Ontario, the earliest however being March in Colorado. The latest date recorded is September in Connecticut (DeLong, 1923*a*) and South Dakota (Severin, 1921*c*). Present specimens indicate this month also in Saskatchewan, Ontario, Wisconsin and Pennsylvania, the latest however being October in Iowa and Michigan.

---

[5] Dr. R. Béigue, in correspondence.

[6] The information between quotation marks is contained on one label, the number of quotations indicating the number of labels.

It has been recorded on grass (Gillette, 1898*a*; Osborn, 1915*a*; DeLong, 1923*a*, *b*; Osborn, 1922*c*, 1928*b*; Medler, 1943*a*; Procter, 1946*a*; DeLong, 1948*a*; Phillips, 1951*a*), rye (Gillette, 1898*a*), oats (Osborn, 1915*a*), grain (DeLong, 1923*a*; Procter, 1946*a*), potatoes (Pettit, 1922*a*), apple trees (Provancher, 1890*a*) and willow catkins (Procter, 1946*a*). It is commonly found in meadows (DeLong, 1923*a*, *b*; Osborn, 1922*c*, 1928*b*; Procter, 1946*a*; DeLong, 1948*a*). Osborn (1928*b*) records its preference in Ohio for blue-grass pastures especially where somewhat shady. DeLong (1923*b*) in an ecological study of Presque Isle, Pennsylvania, found it present in wet meadows in the lagoon-marsh-thicket-forest succession and considered it to be restricted to this habitat. Osborn (1915*a*) likewise found it inhabiting grass near the tide water or salt marshes at Portland, Maine. In the prairie community of Central Canada it is apparently a sub-influent of minor importance (Bird, 1930*a*).

It has been considered of economic importance on oats and grass in Maine (Osborn, 1915*a*) as well as a common pasture and grain pest throughout the spring and summer in this state (Procter, 1946*a*). DeLong (1923*a*) likewise considers it a common pasture and meadow pest throughout the spring and summer in Connecticut. When feeding, it produces very conspicuous external symptoms in the form of small whitish spots on the foliage (Putman, 1941*a*).

Remarks. *Dikraneura mali* shows slight individual variation in the dorsal flexure of the apical region of the aedeagal shaft although the majority of specimens throughout the entire geographical range are as shown in Text-fig. 448. Certain specimens however show a more pronounced curvature, the extreme being shown in Text-fig. 449. Two specimens from Manitoba also lacked the anterior projection on the shaft (Text-fig. 450).

D. mali is distinct from all other species in the genus in the shape of the aedeagus. The absence of pygofer processes is seen in only one other species, *D. robusta* Lawson, although a comparison of the rest of the genitalia indicates that this condition has been independently acquired in both cases. The affinities of *D. mali* within the genus are not evident.

***Dikraneura denticulata* sp. n.**

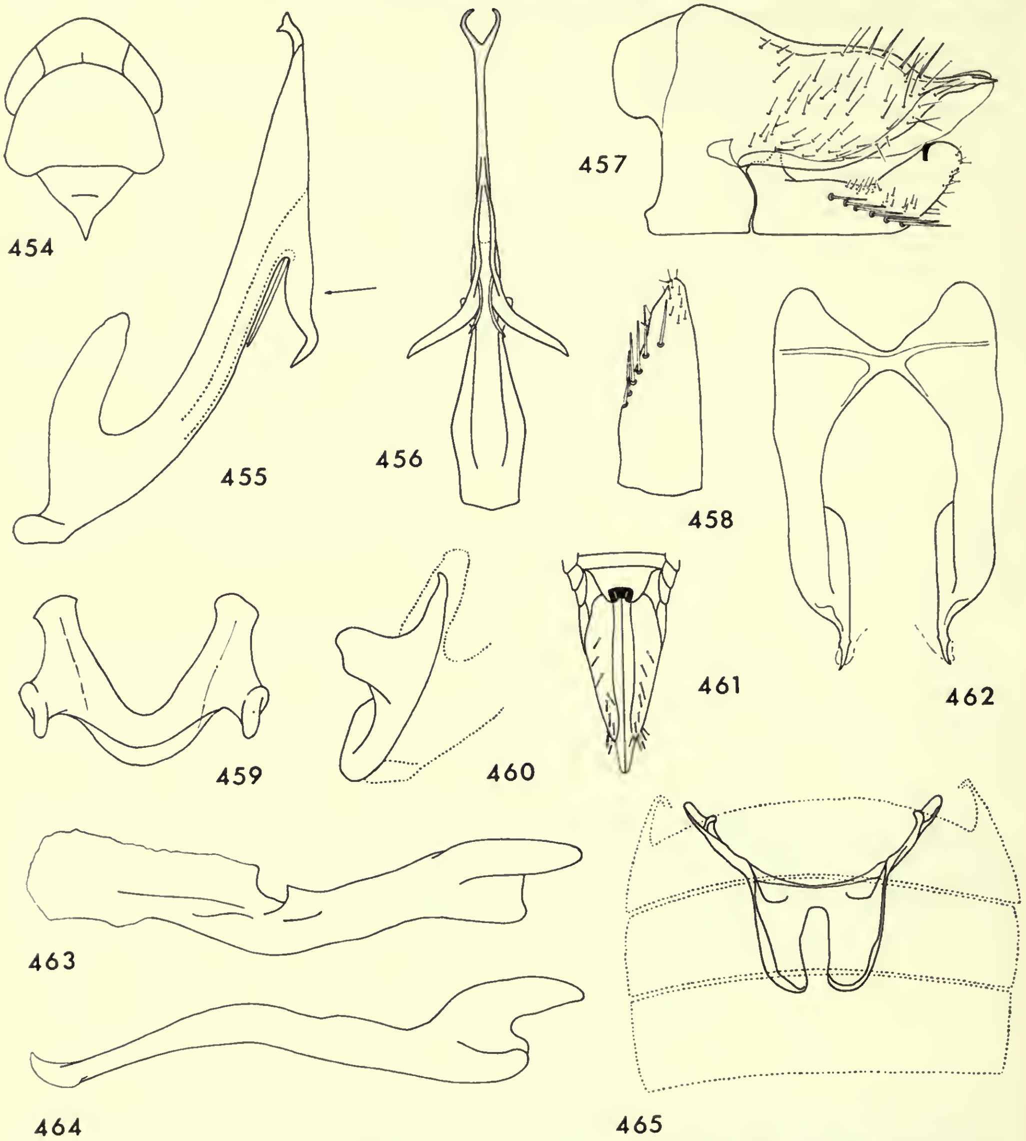
(Text-figs. 454–465)

Length: ♂ 4·34–4·40 mm. (mean 4·37 mm.). ♀ 4·28–4·44 mm. (mean 4·32 mm.).

Head with width slightly narrower than that of pronotum, vertex only slightly produced with apex broadly rounded in dorsal aspect, medial length $1\frac{1}{4}$–$1\frac{1}{3}$ times length next eyes, broadly rounded to face with latter slightly longer than wide, ocellocular area equal in width to antennal fossa; pronotum with width increasing posteriorly.

Colour of head yellow, orange-yellow or light orange-brown, paling over genae and vertex to yellowish cream, eyes testaceous. Pronotum with disc orange-yellow, lateral borders cream marked with yellow; scutellum yellowish, a narrow medial diffuse stripe over vertex, pronotum and scutellum pale whitish cream, often broader in female especially over disc of pronotum;

remainder of thorax with dorsum dark brown, venter pale stramineous washed with yellow. Legs pale stramineous washed basally with yellow. Fore wings with basal area subhyaline greenish yellow, internal edge of clavus and claval suture whitish; apical half hyaline, faintly



FIGS. 454–465. *Dikraneura denticulata* sp. n. 454, head, pronotum and scutellum, dorsal view; 455, aedeagus, left lateral view; 456, aedeagus, posterior view in direction of arrow in fig. 455; 457, male pygofer, valve and subgenital plate, left lateral view; 458, left subgenital plate, ventral view; 459, connective, anterodorsal view; 460, connective, left lateral view; 461, female genitalia, ventral view; 462, male pygofer, dorsal view; 463, left style, dorsal view; 464, left style, left lateral view; 465, abdominal apodemes, dorsal view. Scale as in figs. 1–16.

smoked with brown, veins yellowish. Hind wings hyaline, veins dark brown. Abdomen with dorsum dark brown to black with lateral edge in female cream or yellow, venter yellow; male pygofer and anal tube black, former paling ventrally and latter apically to cream, valve and subgenital plates concolorous cream; female pygofer pale yellowish or cream with dorsum and apex of ovipositor beyond pygofer dark brown, sternum VII cream with medial emargination brown.

Male apodemes elongate, each with length approximately twice width, lateral margin curving dorsally to a height subequal to width, extending to anterior region of fifth segment.

Male genitalia with pygofer tapering posteriorly in lateral aspect and terminating in a short acute posteriorly directed process; distal half of dorsomesal margin produced ventromesally; dorsolateral margin with a row of long spine-like setae along distal one-third; lateral surface with long hair-like setae over posterior two-thirds. Subgenital plates with apical two-fifths turned abruptly dorsoposteriorly and a small heavily sclerotized tooth subapically on dorsolateral margin; a uniseriate row of long spine-like setae along medial third of ventrolateral margin to base of upturned sector with a series of short hair-like setae along ventrolateral margin of latter; lateral surface devoid of setae except over medial area. Aedeagus with preatrium very short; basal apodeme moderately developed, elongate, directed dorsally; shaft elongate, laterally compressed, directed dorsally, tapering towards apex over distal third and terminating in a pair of short anterodorsally directed processes, their apices turned mesad and slightly bifid; a pair of stout elongate processes posteriorly approximately one-third distance from apex, diverging ventrolaterally, their apices turned anteroventrally; a pair of thin needle-like processes at base of posterior processes, between latter and shaft, closely applied and parallel to shaft with their apices slightly divergent; gonopore on posterior margin immediately distad of larger pair of posterior processes.

Female genitalia with sternum VII tapering posteriorly to narrow, concave, posterior margin, the base of the concavity truncate and slightly raised above level of sides in ventral aspect, the edges of concavity heavily sclerotized.

Holotype ♂. East Nepal: Taplejung Distr., Sangu, *c*. 6,200′, 25/28.x.1961 (*R. L. Coe*), in British Museum (N. H.).

Allotype ♀. East Nepal: Taplejung Distr., Sangu, *c*. 6,200′, 16/29.x.1961 (*R. L. Coe*), in British Museum (N. H.).

Paratypes. 2 ♀, same data as holotype, in British Museum (N. H.); 1 ♀, same data as allotype, in British Museum (N. H.); East Nepal: Taplejung Distr., Sangu, *c*. 6,500′, 1 ♂, 1 ♀, 17.x/1.xi.1961 (*R. L. Coe*), in British Museum (N. H.).

Biology. Known only from East Nepal, *Dikraneura denticulata* was collected in October and November in a mixed forest at 6,200′–6,500′. Two females were taken at this locality in October from yellow blooms of cultivated Compositae.

Remarks. *Dikraneura denticulata* is unique from all other species of the genus in the possession of a sclerotized tooth on the subgenital plates as well as the general shape of the latter. It is also unique in the shape of the male pygofer and aedeagus as well as the female VIIth sternum. In general appearance, the aedeagus is similar to that of *D. dreisbachi* sp. n. while the presence of the two pairs of posterior processes near the midlength of the shaft is found in only one other species, *D. stonei* Ruppel & DeLong. In view of the other differences between *D. denticulata* and these species, and the fact that they are found only in Mexico whilst *D. denticulata* occurs in East Nepal, suggests that these similarities are due to convergence rather than indicative of any close relationship.

Apart from *D. variata* Hardy which occurs throughout the whole of the Palaearctic region, *D. denticulata* is the only member of the genus known from this area of the world. However, the area is relatively little known as regards the Cicadellidae and it is very likely that many more species will be found to occur. The unique subgenital plates of *D. denticulata* suggest a new genus although until our knowledge of this region is increased, it is included in the present genus.

SUMMARY AND CONCLUSIONS

The genus *Dikraneura* consists of thirty-three species and is predominantly Nearctic in distribution with only three species, *D. variata* Hardy, *D. aridella* (Sahlberg) and *D. denticulata* sp. n., occuring in the Palaearctic region. Two major groups, separated on the basis of the male genitalia, each with several species-complexes, can be recognized.

TABLE I.

Species-groups and complexes within the genus *Dikraneura*.

Group I

- Group Ia
  - " *variata*-complex "
    - *variata* Hardy
    - *carneola* (Stål)
    - *absenta* DeLong & Caldwell
    - *aridella* (Sahlberg)
    - *omani* sp. n.
    - *shoshone* DeLong & Caldwell
    - *ossia* Beirne
    - *hungerfordi* Lawson
  - " *abnormis*-complex "
    - *abnormis* (Walsh)
    - *etiolata* sp. n.
    - *urbana* Ball & DeLong
- Group Ib
    - *rubrala* DeLong & Caldwell
    - *arizona* DeLong & Caldwell
    - *triangulata* sp. n.
    - *latacephala* Beamer
    - *ungulata* Beamer
- Group Ic
  - " *rufula*-complex "
    - *rufula* Gillette
    - *retusa* Beamer
    - *rubica* DeLong & Caldwell

Group II

- " *serrata*-complex "
  - *vittata* Borland
  - *serrata* DeLong & Caldwell
  - *beameri* Borland
  - *jalapensis* sp. n.
  - *dreisbachi* sp. n.
  - *halberda* Ruppel & DeLong
  - *stonei* Ruppel & DeLong
- " *angustata*-complex "
  - *angustata* Ball & DeLong
  - *torta* DeLong & Caldwell
  - *arcta* Ruppel & DeLong
- " *ardea*-complex "
  - *ardea* Ruppel & DeLong

The largest of these groups (Group I), consisting of nineteen species, is characterized by the pygofer processes being recurved dorsolaterally and devoid of teeth or additional processes along their length. The aedeagus terminates in a pair of posteriorly directed processes with a pair of additional anteriorly directed processes arising laterally or posterolaterally at varying positions on the shaft. The latter processes are rarely dorsally directed and occasionally absent while the terminal ones are rarely subapical. The group is Nearctic in distribution with the exception of *D. aridella* (Sahlberg) which is restricted to Europe and *D. variata* Hardy which occurs in both the Palaearctic and the north-west region of North America. The group may be subdivided, on the basis of the male pygofer, into those with a conspicuous dorsal convexity at the base of the posterior process (Group Ia), those without a convexity at the base of the process (Group Ib) and those with the posterior process itself reduced (Group Ic).

The larger of these subdivisions (Group Ia) consists of two species-complexes, the "*variata*-complex" of eight species, entirely western and northern in distribution but with *D. variata* Hardy and *D. aridella* (Sahlberg) occurring in the Palaearctic region, and the "*abnormis*-complex" of three species which is more eastern in distribution. Both these species-complexes are distinguished by the shape of the aedeagus, the former having a pair of simple apical processes and the latter having the apical processes branched or of two pairs.

The smaller of the subdivisions (Group Ic) contains only one species-complex, the "*rufula*-complex", consisting of three closely related species characterized by the reduction of the pygofer processes. This group is western and south-western in distribution.

The remaining subdivision (Group Ib), possessing the elongate processes of Group Ia but without a dorsal convexity at their base, is of a more heterogeneous nature than the preceding two subdivisions and shows certain characters in common with both. No distinct species-complexes are apparent and their treatment as one group is for convenience rather than an implication of natural affinity between the included species. *D. rubrala* DeLong & Caldwell is closely related to the "*variata*-complex", having the general aedeagal structure and short abdominal apodemes typical of the latter and should perhaps be included in that group. *D. arizona* DeLong & Caldwell is unique in the possession of a detached sclerite located dorsomesad at the base of the pygofer process which is a possible remnant of the dorsal expansion found in the "*variata*-complex". The aedeagal structure is typical of the latter group yet the abdominal apodemes are much larger. The former of these species is north-eastern in distribution and the latter south-western. The remaining three species of this sub-division, *D. latacephala* Beamer, *D. ungulata* Beamer and *D. triangulata* sp. n., are restricted to Colorado, Arizona and Mexico respectively and are of more doubtful affinities. The aedeagus of the two former species is similar to that of the "*rufula*-complex" in the possession of a medial spine at the apex of the posterior margin of the aedeagus but differ greatly in the shape of the pygofer. Both *D. latacephala* and *D. triangulata* also differ from the majority of species in the genus by the absence of a well produced, angulate vertex and the possession of a wide ocellocular area. These two characters are found in only one other species, *D. robusta* Lawson, also found in the south-west but distinguished by the absence of pygofer processes and the unique shape of its aedeagus. *D. triangulata* differs further by the possession of straight dorsally directed pygofer processes and subapical rather than apical processes on the aedeagus.

The second major group within the genus (Group II) consists of eleven species characterized by the pygofer processes being recurved antero- or dorsomesally with teeth or additional processes along their length. The aedeagus is inclined more posteriorly and is without posteriorly directed apical processes in the majority of species although a pair of anteriorly or ventrally directed processes near the midlength of the shaft is still present. Unlike Group I, it is predominantly Mexican. Three main species-complexes may be recognized.

The largest of these, the " *serrata*-complex ", consists of seven species characterized by a laterally compressed aedeagus with anteriorly or ventrally directed processes arising from the posterior margin near its midlength and with paired apical processes absent or only weakly developed. The group is restricted to Mexico with only one species, *D. serrata* DeLong & Caldwell, occurring also in Arizona.

The next largest, the " *angustata*-complex ", consists of three very closely related species, distinguished from the preceding group, to which it is closely related, by a more cylindrical aedeagus, the presence of lateral rather than posterior midshaft processes and the possession of a pair of anteriorly directed flap-like apical processes (except possibly in *D. arcta* DeLong & Caldwell). Unlike the " *serrata*-complex ", this is more widespread, *D. angustata* Ball & DeLong itself occurring over the entire eastern half of the United States from Ontario to Mexico. The other two species, however, are more restricted and are found only in Arizona.

The third and last, the " *ardea*-complex ", contains only the species *D. ardea* Ruppel & DeLong. It is unique in that the aedeagus is S-shaped and terminates in a pair of elongate ventrally directed processes, the lateral midshaft processes being modified into a pair of short triangular flap-like processes which extend along a major portion of the shaft. Like the majority of species in the " *serrata*-complex ", it is confined to Mexico.

Of these three species-complexes the " *serrata*-complex " is the one most closely related to Group I. In the species *D. vittata* Borland the teeth are absent or represented rarely by only a single one at the base of the pygofer process while the processes themselves are elongate rather than robust and strongly recurved as in the majority of the other species. The basal apodeme of the aedeagus is also very similar to that seen in Group I rather than in species of its own group.

The remaining members of the genus, *D. robusta* Lawson, *D. mali* (Provancher) and *D. denticulata* sp. n., are distinct from one another as well as from other species of the genus and their affinities among the latter are uncertain. Both *D. mali* and *D. robusta* lack posterior processes on the pygofer although this has undoubtedly been arrived at independently as can be seen from the other components of the genitalia. The head of *D. robusta*, in particular the width of the ocellocular area, is similar to that of *D. latacephala* Beamer and *D. triangulata* sp.n., as mentioned earlier, and all three species are restricted to the south-west area of the Nearctic region. The structure of the genitalia, however, would again suggest this to be an independent development in all three cases rather than an indication of a natural affinity between them. Unlike *D. robusta*, *D. mali* is a widespread species found throughout the northern half of the region. The species *D. denticulata* shows characters of both pygofer and subgenital plates which are unique within the genus, as also is the VIIth sternite in the female. The general appearance of the aedeagus is similar to that of *D. dreisbachi* sp. n., whilst the two pairs of processes on the posterior margin near its midlength is found in only one other species, *D. stonei* Ruppel & DeLong, both these species occurring in the " *serrata*-complex " and being found only in Mexico. Other pecularities of the male and female genitalia and its restriction to East Nepal, suggests the similarity to be due to convergence rather than indicative of a close relationship.

From this overall picture of the genus, its species-complexes and their geographical distribution, it is now possible to suggest probable zoogeographical stages in its evolution. The close relationship between the species *D. aridella* (Sahlberg), *D. variata* Hardy, *D. carneola* (Stål) and *D. absenta* DeLong & Caldwell, and their distribution over the Palaearctic or western Nearctic region, indicates a movement across the Bering Straits in either an easterly or westerly direction. The fact that *D. variata*, the only species common to both areas, is of rare occurrence in the Nearactic region and also highly variable in the latter indicating an unstable genotype, suggests that the Nearctic populations are at the fringe of the species range rather than a viable source of emigrants towards the Palaearctic. An easterly movement across the Bering Straits is therefore indicated. The large number of species in the Nearctic region as compared with the Palaearctic suggests that once present within the New World, the group underwent an initial period of speciation giving rise to the majority of species now found throughout the United States and Canada. A second period of speciation later appears to have occurred in Mexico giving rise to those species of which the majority are currently restricted to this area. The unique nature and widespread occurrence of many of the species present within the United States as compared to the more uniform appearance and restricted distribution of the Mexican species indicates a more recent origin of the latter and supports the hypothesis of a north–south movement over the continent. Subsequent to this second period of speciation, only one species, *D. angustata* Ball & DeLong, has so far been successful in moving north in competition with the previously established species of the region. It is of interest that it is found only over the eastern half of the region rather than the west where the majority of the Nearctic species are found, indicating a possible inability to compete with these species. Further support for this movement into and then out of Mexico is furnished by the fact that *D. vittata* Borland, which as we have seen is the most closely related of the Mexican species to the major Nearctic group, is found only in Mexico. *D. angustata* on the other hand is further removed morphologically from the major Nearctic group and is unlikely to have evolved from the latter and then entered Mexico to have given rise to *D. vittata* and related species.

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BY

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CONTRIBUTIONS TOWARDS A REVISION OF *MYRSIDEA* (MENOPONIDAE : MALLOPHAGA) III.

By THERESA CLAY

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SYNOPSIS

This part deals with the species of *Myrsidea* Waterston parasitic on the New World Avian family, Icteridae, and includes the re-description of the known species and the descriptions of six new species; a key to the species and a host-parasite list is included. In addition two New World species from non-Icterid but unknown hosts, are re-described from type material. A note is included on *Myrsidea luroris* (Carriker).

MYRSIDEA PARASITIC ON THE ICTERIDAE

Comparatively little material of *Myrsidea* is available from the Icteridae, a family comprising 95 species in 35 genera (according to Osgood in Hellmayr, 1937). However, it was decided to study the species of *Myrsidea* parasitic on this family as some of the described S. American *Myrsidea* obviously originated from these birds in spite of the recorded hosts and Icterids had erroneously been given as type hosts for two species.

Through the kind co-operation of various individuals and institutions it has been possible to examine the type material of all the described species. As discussed in part I (Clay, 1966 : 331) the characters for species differentiation in *Myrsidea* are most marked in the female, while the characters of the male genital sclerite are usually the most useful for phylogenetic grouping. This is so in the Icterid-infesting species, all the males having very similar genital sclerites with the exception of *comosa*, of which the sclerite though quite distinctive, is also of the same general type. The bursa copulatrix (see below, p. 207) is also similar in all the species examined. Possible relationships within the group may be shown by the male genital sclerite and the form of the female sternites.

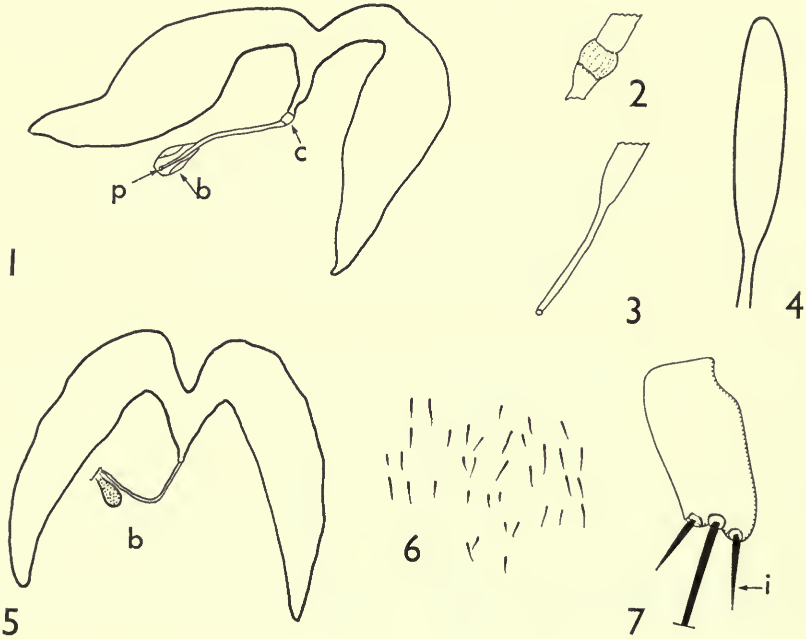
Taxonomic Characters of the Icteridae-infesting Species

Apart from the combination of the form of the male genital sclerite and the female bursa, there is no other character or group of characters by which a specimen can be identified as a parasite of the Icteridae. Certain characters are found in all the species dealt with here (except when otherwise stated) and these are listed below to save repetition in the specific descriptions; the generic characters of *Myrsidea* as given in Clay, 1966 : 330–332 are not repeated.

1. Head of the same general shape (Pl. 2, fig. 4); differences shown by the measurements (Tables VII–VIII). Number and position of head setae as in *thoracica* (Clay, 1966, fig. 1). Antenna as in Clay, 1966 : 338 and fig. 2.

2. Thorax. Pronotum with three spiniform setae near each antero-lateral corner and 3 + 3 long stout setae on the posterior margin; in some specimens of *comosa* there is also a short spiniform seta on one or both of the lateral margins. Mesonotum undivided. Metanotum posteriorly with one long stout seta each end (not included in setal counts) and a varying number of submarginal setae (the central setae); metapleural setae all short and spiniform. First tibia with 3 outer ventro-lateral setae and 4 outer dorso-lateral (Clay, 1966, fig. 5, v and d), except in *magnidens* which has a greater number of the dorsal setae.

3. Abdomen. The sternites are usually more heavily pigmented than the tergites making it difficult in mounted specimens, unless dissected, to see the outlines of the modified female terga. Any of the ♀ sternites IV–VI may be narrowed and arched medianly. Spiracles on the tergites. Edge of vulva strongly serrate;



FIGS. 1–7. 1–3. *Myrsidea fuscomarginata.* 1, Spermatheca. 2, Calyx. 3, Proximal opening of spermathecal tube. 4, *M. comosa.* Spermatophore. 5, *M. aitkeni* Clay, 1966. Spermatheca. 6, *M. comosa.* Microtrichia on wall of genital chamber. 7, *M. fuscomarginata.* ♀ pleurite VIII. b, bursa copulatrix; c. calyx; p, proximal opening of spermathecal tube; i, inner seta.

microtrichia on surface of genital chamber as in *M. abidae* (Clay, 1966, fig. 23) except in *comosa* (Text-fig. 6). The spermatheca (Text-fig. 1) is a large bilobed sac from which runs a tube, often long; near the sac the tube has a swollen modified portion (Text-fig. 2), this may be called the calyx as it appears to be similar in position and perhaps function to the calyx of the spermatheca of the Philopteridae (Cummings, 1917 : 649). The proximal opening of the spermathecal tube appears to be in a thin-walled structure, liable to distortion in mounted specimens, but which is always similar to that shown in Pl. 1, fig. 4. This structure (Valves of Blagoveshtschensky, 1956 : 21, fig. 6) is here called the bursa copulatrix, although until more is known of its morphology and function it is not possible to say whether it is a true bursa copulatrix. The pear-shaped structure referred to as the spermatheca in Clay, 1966 (Pl. 1, fig. 4) is in position and function probably the same as the structure in the Icterid-infesting species here referred to as the bursa; the true spermatheca of *Myrsidea aitkeni* is shown in Text-fig. 5. In mounted or dissected specimens with this type of bursa it is not possible to see the exact relationship of the spermathecal tube to the bursa; in some specimens the bursa may appear oval or round (Pl. 1, fig. 5). Pl. 1, fig. 5 in Clay, 1966 represents the calyx.

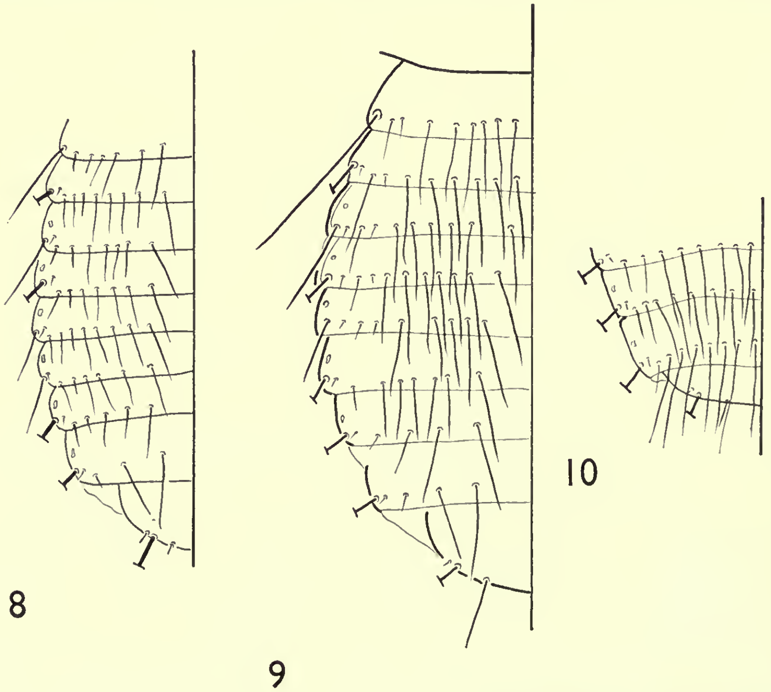
Probably all *Myrsidea* have spermatophores, these are conspicuous, bottle-shaped structures often seen in the male abdomen. Pl. 1, fig. 1 shows a spermatophore in the ductus ejaculatorius of *Myrsidea isostoma* (Nitzsch), fig. 2 shows one in the extruded genital sac of *M. aitkeni* Clay and fig. 3 in the abdomen of *M. aquilonia*; these are respectively a Corvidae-, Turdidae- and Icteridae-infesting species. The spermatophore of *M. comosa* (Text-fig. 4) is narrower than those seen in other Icterid-infesting species. It is probable that the contents of the spermatophore pass into the spermathecal tube via the bursa and the spermatophore then disintegrates; in only one female, amongst specimens from Icterid hosts, has a spermatophore been seen. The bursa may be designed to hold the neck of the spermatophore and the male genital sclerite to act as a guide for it. Dr. von Kéler (in press) has described and discussed similar spermatophores in the Boopidae. The form of the spermatophore may prove to be of taxonomic value, for instance, spermatophores with very long, attenuated necks have been seen in species of *Austromenopon* from both the Charadriiformes and Procellariiformes.

The male genitalia are of the typical *Myrsidea* type; there are differences in the shape of the posterior inwardly projecting arm of the basal plate: in *psittaci* and *comosa* this is angulated, in other species curved or almost straight (Pl. 2, figs. 5–7, a.). As in other *Myrsidea*, the form of the genital sclerite provides useful taxonomic characters. In the Icterid-infesting species, this sclerite comprises a flattened plate with a ventral and dorsal arm each side (Text-fig. 15, v, d), the latter arm is toothed distally. In mounted specimens the ventral arms are usually pressed out laterally and their true shape distorted (cf. Text-figs. 25 and 26), the shape cannot therefore be used as a taxonomic character; there is also some minor individual variation in the length and breadth of the plate. Specific differences are shown in the general shape and length of the plate posterior to the dorsal arms and in the form of the dorsal arms. The genitalia of *comosa* are rather different (see below).

4. Chaetotaxy of the Abdomen. Post-spiracular setae III and V are always

shorter and finer than II and IV; last tergum has 1 + 1 inner posterior setae (Text-fig. 12, p); sternum I without setae. Sternite II with 2–6 spiniform setae in the aster at each postero-lateral corner; in Clay, 1966 : 340 it was said that the fine tips of these setae were liable to break off, a photograph taken with the Stereoscan Electron Microscope (Pl. 1, fig. 8) shows the tip of a seta and the place where the break probably takes place. Sternites III–VII in the male with a continuous row of marginal setae; arrangement of these setae in the female varies and is given in the specific descriptions. Anal corona as in Text-fig. 11; male with 4, occasionally 5 fine setae on posterior margin of abdomen and 8 minute internal setae.

The following characters are useful for distinguishing the species: 1. Degree of development of the hypopharyngeal sclerites. 2. Relative lengths of the peg-like and adjacent seta which form the pair of sensory setae on the last segment of the maxillary palp (Pl. 1, figs. 6–7). 3. Relative lengths of head setae 10 and 11[1] (Clay, 1966, fig. 1). 4. Modifications of the terga in the female. 5. Shape and length of the female sterna. In the descriptions these sternal characters are shown by the sternal ratio, that is the length in the mid-line of sterna III–VI expressed as a ratio of sternite II; to facilitate measurements, that of II is of the sternite and those of III–VI of the sterna. These ratios are somewhat approximate as they are taken from one specimen only and there is obviously variation between specimens



Figs. 8–10. Terga of ♂ abdomen. 8, *M. mirabilis.* 9, *M. balteri.* 10, *M. psittaci.*

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[1] 10 (anterior) and 11 (posterior) are the last two marginal setae anterior to the preocular notch (see Pl. 3, fig. 3).

and sometimes slight distortion of the abdomen, but the ratios give a general indication of the relative sizes of the sterna. 5. Male genitalia. 6. Length and thickness of post-spiracular seta VI. 7. Numbers and lengths of the tergal setae. 8. Presence or absence of anterior median setae on tergites and sternites and of anterior setae on the pleurites.

Species Descriptions

In the following descriptions one alteration has been made in the terms used: latero-ventral head fringe (Clay, 1966, fig. 1, f-l) is changed to subocular comb row or shortened to subocular setae; this will conform with the usage in the revisionary papers by Price *et alii* (e.g. Price & Beer, 1965 : 665). The remarks on measurements and text-figures in Clay, 1966 : 340 apply here, and on the numbers of setae (: 339) but it can be repeated that in the counts of the abdominal setae, the marginal setae of tergite I are divided into the post-spiracular seta each side and the tergocentral setae and on tergites II–VIII into the post-spiracular setae each side with the small, usually spine-like seta associated with it and the tergocentral setae. Text-figures of ♀ abdomens are not drawn to the same scale (see Table VII). $\bar{X}$ = mean; number of specimens in brackets. The following abbreviations for collections are used: B.M.—British Museum (Natural History); E.C.—Emerson collection; U.S.N.M.—United States National Museum, the Carriker collection is now in this Museum.

Myrsidea diffusa (Kellogg, 1899).

(Text-figs. 11–13)

Type host: *Cacicus h. holosericeus* (Lichtenstein).

Colpocehalum diffusum Kellogg, 1899 : 40, pl. 4, figs. 3, 4. Hosts: *Amblycercus holosericeus*, various passerines, *Piaya cayana* and *Ardea virescens*.

Through the kindness of the authorities of the College of Agriculture, University of California it has been possible to examine the type material of this species; among the original material from the hosts listed by Kellogg is a slide with 1 ♂, 1 ♀ and 2 nymphs from *Amblycercus holosericeus*, Panama, which is marked " fig'd ", denoting that the original figures were probably based on specimens on this slide. These specimens are the same as others in the Carriker collection from the same host. The female on Kellogg's slide will therefore be designated as lectotype, thus fixing the type host as *A. holosericeus* = *Cacicus holosericeus*. The generic arrangement of the species of this avian family is according to Dr. Blake (see Acknowledgment).

♀ and ♂. Hypopharynx fully developed (as in Pl. 2, fig. 1). Peg-like seta of maxillary palp (as in Pl. 1, fig. 6) relatively shorter than the adjacent seta compared to those of *M. thoracica* (fig. 1, p. in Clay, 1966). Head seta 10 short, ♀ 44 μ; ♂ 36–40 μ; ratio 10/11 : ♀ (1), 0·39; ♂ 0·27–0·30. Subocular setae 9–10 each side; gular setae 4–5 each side. Central setae of metanotum: ♀, 4 + 5; ♂, 4 + 4; metasternal setae 3–4 each side; metapleural setae 3 + 3. Setae of femoral brush (Clay, 1966, fig. 7): lectotype ♀, 14 + 14; paratype, ♂, 13 + 13; ♀ from *A. holosericeus flavirostris*: 16 + 16; ♂, 18 + 16, 14 + 14. ♀ sterna V–VI narrowed and arched medianly (Text-fig. 11), sternal ratio II–VI (see above p. 208): 100 : 83 : 42 : 20 : 18; pigmentation of sternite III somewhat dumb-bell-shaped as in Pl. 4, fig. 1. ♂ genital sclerite (Text-fig. 13).

Abdominal Chaetotaxy (Text-figs. 11–12). Post-spiracular seta VI markedly shorter and finer than VII. Tergocentral setae: ♀ (1), I, 12; II–III, 10; IV, 12; V, 13; VI, 12; VII, 11; VIII, 6. ♂ (1) I, 11; II, 14; III, 13; IV, 16; V, 13; VI, 12; VII, 9; VIII, 5. Marginal setae of sternites: ♀(1), II, 20; III, 24; IV, 19; V, 20; VI, 16; VII, 14; VIII–IX, 14; vulval, 8. ♂ (1), II, 17; III, 25; IV–V, 21; VI, 18; VII, 15; VIII, 7; IX, 11. Anterior setae of sternite II: ♀, ♂, 6. Lateral anterior sternal setae: ♀, III, 1 + 2; IV–V, 2 + 3; VI–VII, 2 + 1; ♂, III, 2 + 1; IV, 3 + 3; V, 2 + 3; VI–VII, 3 + 3; VIII, 0 + 0. Pleural setae: ♂, I, 5 + 5; II, 5 + 6; III, 9 + 5; IV, 6 + 7; V, 5 + 6; VI, 5 + 5; VII, 3 + 4.

Material examined. Syntypes: 1 ♂, 1 ♀, 2 nymphs on slide No. 417B from *Cacicus holosericeus*, PANAMA. 2 ♂, 1 ♀ from *C. holosericeus flavirostris* (Chapman), COLUMBIA: Acandi, Choco, 27.xii.1949 (*M. A. Carriker*, No. 16715).

LECTOTYPE of *M. diffusa* (Kellogg) by present designation: ♀ on slide No. 417 b, marked type and "fig'd", in the Division of Entomology, University of California with the data as given above.

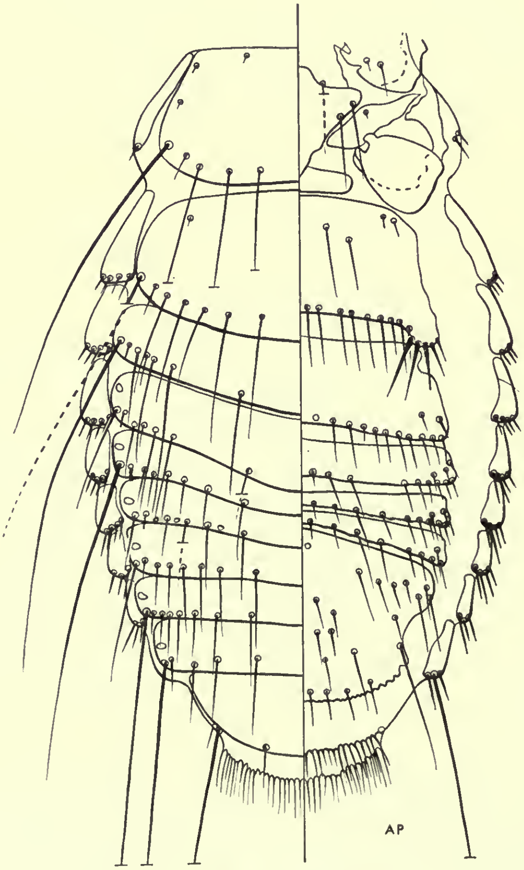


FIG. 11. *M. diffusa*. ♀

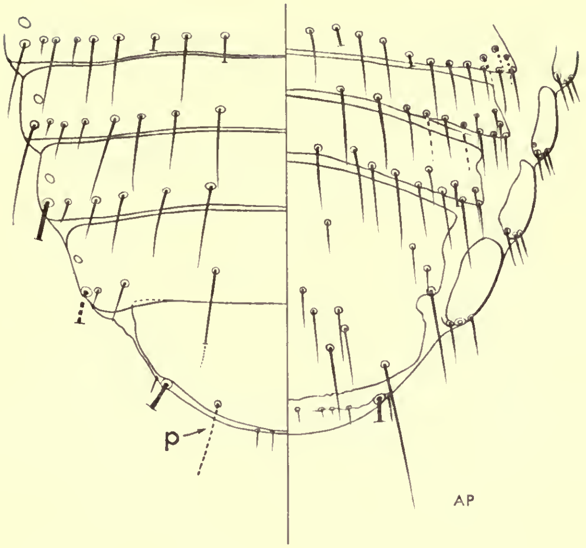


FIG. 12. *M. diffusa.* ♂ terminal segments of abdomen. p, inner posterior seta.

Myrsidea picta Carriker, 1955

(Pl. 1, fig. 6; Pl. 4, fig. 1. Text-figs. 15, 17–18)

Type host: *Cacicus c. cela* (Linn.).

Myrsidea picta Carriker, 1955 : 40, figs. 5–6. Host: *Cacicus c. cela.*

This species is distinguished from *diffusa* by the presence of an anterior short, fine seta each side of sternite III; in the female by the modifications of the anterior terga and in the male by the more numerous tergal setae and the genital sclerite. Characters given under *diffusa* which do not differ are not repeated.

♀ and ♂. Gular setae 4–6 each side, total: ♀, 10–12, $\bar{X}$ (8) 10·7; ♂, 8–11, $\bar{X}$ (9) 9·8. Central setae of metanotum: ♀, 13–16, $\bar{X}$ (8) 15·1; ♂, 11–15, $\bar{X}$ (9) 13·2; metapleural setae: ♀, 4 + 4; ♂, 3 + 3 (2 specimens with 2 + 3). Setae of femoral brush: ♀, 12–19, $\bar{X}$ (16) 15·3; ♂, 13–17, $\bar{X}$ (16) 14·2 and one (? abnormal) specimen with 8 + 8. ♀ terga II and III have unpigmented areas as shown in Text-fig. 18. ♀ sternites V–VI, (Pl. 4, fig. 1) narrowed and arched centrally, sternal ratio II–VI : 100 : 51 : 34 : : 17 : 17. ♂ genital sclerite (Text-fig. 15).

Abdominal Chaetotaxy (Text-fig. 17; Tables I–VI). Post-spiracular seta VI markedly shorter and finer than VII, relatively a little longer in ♂. In both sexes sternite III usually has a short fine anterior seta each side, this is not included in the count of the lateral anterior setae. Length of inner posterior setae of last ♂ tergum as in *diffusa.* ♀ sternites III and IV with lateral gap in row of marginal setae each side of the central group; V and VI with a continuous marginal row.

Material examined. From *Cacicus cela cela*, VENEZUELA: San Felipe, Yaracuay, 1 ♀ (topotype) 18.v.1938 (*P. J. Anduze*), E. C.; San Felix, Rio Orinoco, 2 ♂, 14.ii.

1910 (*M. A. Carriker*), U.S.N.M. West Indies, Trinidad: Biche, 2 ♂, 2 ♀, 24.i.1957 (*W. G. Downs*, TRVL. 543), U.S.N.M.; Caiqual, 1 ♂, 1 ♀, 24.ii.1959 (*T. H. G.. Aitken*, 2265), U.S.N.M.; Brazil Village, 6 ♂, 5 ♀, 25.ii.1966 (*Aitken*, TRVL 11388), (B.M.); 1 ♂ from *Cacicus cela vitellinus* (Lawrence), Colombia: El Conejo, 23.iii.1945 (*M. A. Carriker*), U.S.N.M.

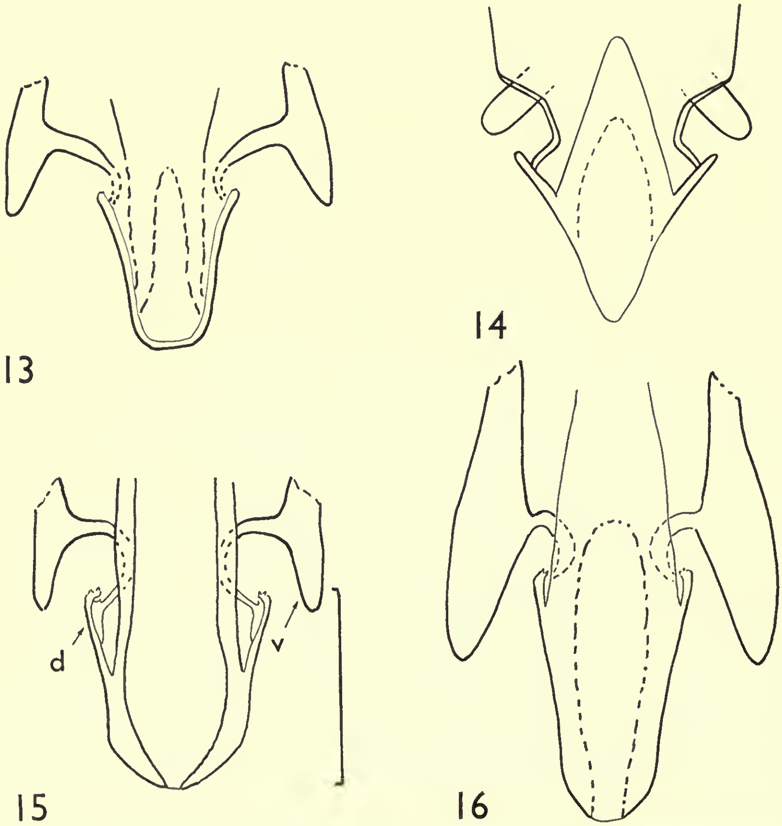
Myrsidea magnidens Stafford, 1943

(Pl. 3, fig. 1. Text-figs. 14, 19–20)

Type host: *Pitangus sulphuratus rufipennis* (Lafresnaye). ? Error.

Myrsidea magnidens Stafford, 1943 : 41, figs. 10–17. Host as above.

Through the kindness of Professor E. W. Stafford it has been possible to examine the holotype and allotype of this species. The characters of the male genital sclerite and the female bursa make it probable that these specimens originated from one of the Icteridae. The condition of the two type specimens make it difficult to see the



Figs. 13–16. ♂ genital sclerite. 13, *Myrsidea diffusa*. 14, *M. magnidens* (approximate reconstruction). 15, *M. picta*. 16, *M. balteri*. Line = 24 μ.

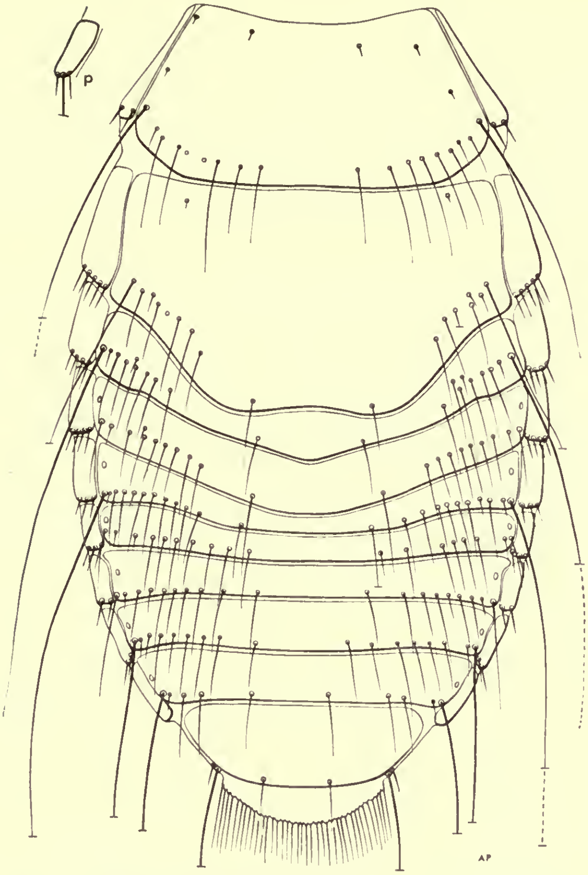


FIG. 17. *Myrsidea picta*. ♀ dorsal. p, pleurite VIII.

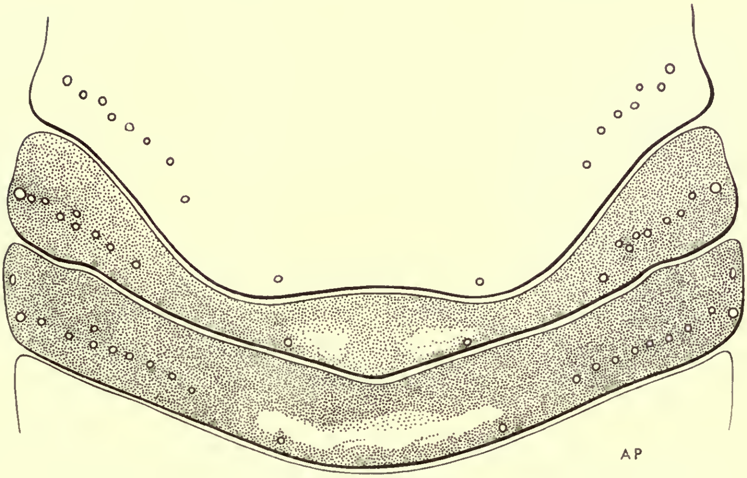


FIG. 18. *Myrsidea picta*. ♀ terga I–III.

outline of the sclerotized plates and the central area of the thoracic sterna is largely obscured in the female. The chaetotaxy on the other hand, is in good condition, few of the setae being lost or broken. This species is distinguished in both sexes by the greater number of outer dorso-lateral setae on the first tibia, in the female by the form of the anterior terga and abdominal chaetotaxy and in the male by the continuous marginal row of long setae on tergites I–VIII and the presence of anterior median setae on sternites V–VII.

♀ and ♂. Hypopharynx fully developed. Length of peg-like seta on maxillary palp not recorded. Head seta 10 rather long, probably a little over half the length of 11; subocular setae 12–13; gular setae 4 + 5. Central setae of metanotum: ♀, 19; ♂, ? 18; metasternal setae: ♂, 5 + 3; metapleural setae: ♀, 3 + 2; ♂, 3 + 3. Outer dorso-lateral setae of 1st tibia: ♀, 11 + 12, ♂, 11 + 10; Setae of femoral brush: ♀, ? + 33; ♂, 32 + ?. None of the ♀ sterna greatly narrowed or arched. Only the broad part of the bursa can be seen, this resembles that shown in Pl. 1, fig. 4. The mesosomal plate of the single ♂ appears asymmetrical but this may be an artefact.

Abdominal Chaetotaxy (Text-figs. 19–20 and Table II). Post-spiracular seta VI shorter and finer than VII. Tergocentral setae: ♀, I, 3, 1 + 1, 2; II, 3, 1 + 1, 4; III, 4, 1 + 1, 6; IV, 26; V, 28; VI, 13 + 13; VII, 10, 1 + 1, 13; VIII, 5, 1 + 1, 5. In addition to the seta near each post-spiracular seta, the ♀ tergites have anterior lateral setae as follows: I, II, III, V, 1 + 1;

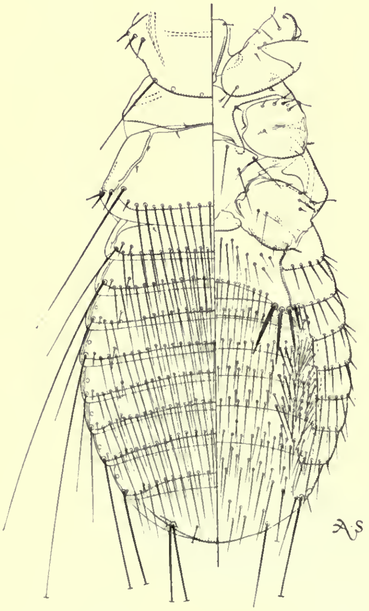


FIG. 19. *Myrsidea magnidens.* ♂.

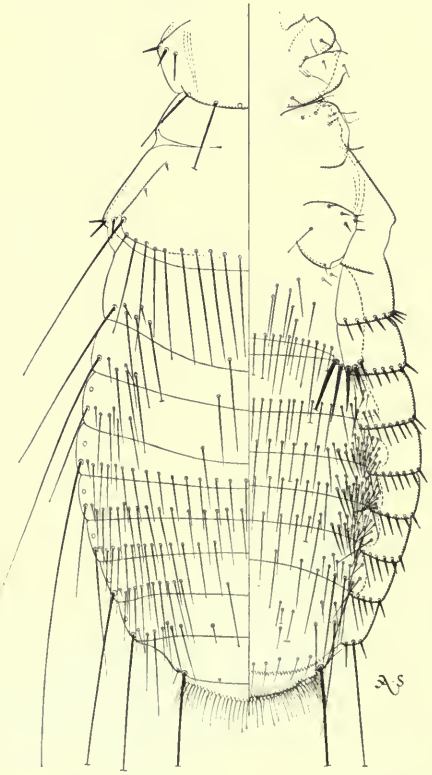


FIG. 20. *Myrsidea magnidens.* ♀.

IV, 0 + 1; VI, 0 + 2; VII, 0 + 0; VIII, 1 + 0. Tergocentral setae: ♂ in Table II; tergites I–VIII have one or two anterior lateral setae each side in addition to the short seta near the post-spiracular seta. Sternal setae as in Text-figures 19–20; anterior median sternal setae in ♂: III, 6; IV, 7; V, 10; VI, 10; VII, 11. Inner pleural seta of VIII in ♀ slightly longer than outer; in ♂, inner considerably longer than outer.

Material examined. Holotype ♂ and allotype ♀. VENEZUELA: La Calimana, 12.ii.1938 from *Pitangus sulfuratus rufipennis*.

Myrsidea mirabilis (Carriker, 1903)

(Pl. 4, fig. 2. Text-figs. 8, 21–22)

Type host: *Psarocolius wagleri ridgwayi* (van Rossem).

Colpocephalum mirabile Carriker, 1903 : 175, pl. 6, fig. 5. Host: *Zarhynchus wagleri* = *Psarocolius wagleri*.

Myrsidea gymnostinops Eichler, 1951 : 51, fig. 6. Host: *Gymnostinops montezuma* = *Psarocolius bifasciatus* Bonaparte, **syn. nov.**

The males of this and the three following species *tropicalis*, *downsi* and *laciniata*, resemble each other in the form of the genital sclerite and the presence, on sternite III at least, of anterior median setae. Characters found throughout this group will be given under *mirabilis* only and the differences between this species and the following three will be given under the individual species. *Myrsidea luroris* (Carriker) recorded from the type host of *mirabilis* is discussed below, p. 233.

♀ and ♂. Hypopharynx fully developed. Peg-like seta of maxillary palp as in *diffusa*, Head seta 10 short compared with 11: 28–42 μ. Subocular setae 8–9; gular setae 4–5 each side. Central setae of metanotum: 2 + 2; metasternal setae 4–5 each side; metapleural setae 3–4 each side. Setae of femoral brush: ♀, 15–18, $\bar{X}$ (6) 16·3; ♂, 12–14, $\bar{X}$ (7) 12·1. ♀ metanotum enlarged; ♀ sterna IV–VI narrow and arched (Pl. 4, fig. 2); sternal ratio II–VI, 100 : 53 : 29 : 29 : 29. ♂ genital sclerite Text-fig. 22.

Abdominal Chaetotaxy (Text-figs. 8, 21, Tables I–VI). Post-spiracular setae III, V and VI of ♀ markedly shorter than the rest, somewhat longer in ♂; VII somewhat shorter and finer than VIII in both sexes. ♀ terga I-III with lateral anterior setae (included in count of tergocentrals). ♂ tergocentral setae of II–VIII with central gap, the seta each side of gap being longer than the remainder. ♀ sternite III with anterior median setae as follows: one specimen with 3, 7 with 1 and 3 with none; ♀ sterna III–VI with 4–5 rather widely spaced central marginal setae. Lengths of post-spiracular seta VI and of inner posterior seta of last ♂ tergum given below under *tropicalis*.

Material examined. Paratypes of *mirabilis*, 1 ♂, 1 ♀ (headless), COSTA RICA: Juan Vinas, iii.1902 (*M. A. Carriker*); seen through the kindness of the late Mr. M. A. Carriker. HONDURAS (skin, no other data), 5 ♂, 1 ♀. PANAMA: Summit, 1 ♂, 1 ♀, 5.iv.1934 (*F. C. Bishop*). COLOMBIA: Acandi Choco (8° 32′ N, 77° 20′ W), 13 ♂, 9 ♀, 19.i.1949, 3.i.1950, 4.i.1950 (*M. A. Carriker*). All specimens from *Psarocolius wagleri*.

Syntypes of *gymnostinops*, 3 ♂, 3 ♀, COSTA RICA: seen through the kindness of Professor W. Eichler. COSTA RICA: Guapilies, 2 ♂, 2 ♀, 27.ii.1966 (*W. L. Brown*). MEXICO (skin, no further data), 1 ♂, 1 ♀. All from *Psarocolius bifasciatus*. These specimens average somewhat larger than those from *P. wagleri*, as would be expected from the relative sizes of the two host species; in other characters they agree with *mirabilis* from the type host.

The following specimens from *Psarocolius wagleri* are near the *mirabilis* group but are not typical: COLOMBIA: Ventanas, Antioquia, 1 ♂, 2 ♀, 17.vi.1948 (*M. A. Carriker*, 13969). Further specimens from *Psarocolius wagleri* as follows: COLOMBIA: La Guayacana, Narino, 3 ♂, 8 ♀, 25.vii.1957 (*M. A. Carriker*, 26702) can be included in the following species, *M. tropicalis*.

Myrsidea tropicalis sp. n.

(Pl. 1, fig. 4; Pl. 4, fig. 3. Text-fig. 27)

Type host: *Psarocolius angustifrons alfredi* (Des Murs).

This species resembles female *mirabilis* in the enlarged metanotum, the 2 + 2 metanotal setae and the general characters of terga III–IV. It can be distinguished

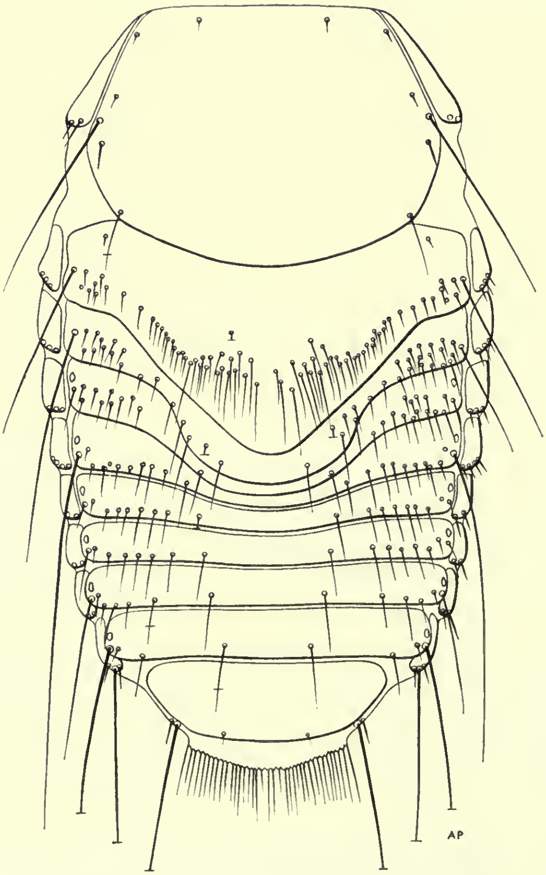
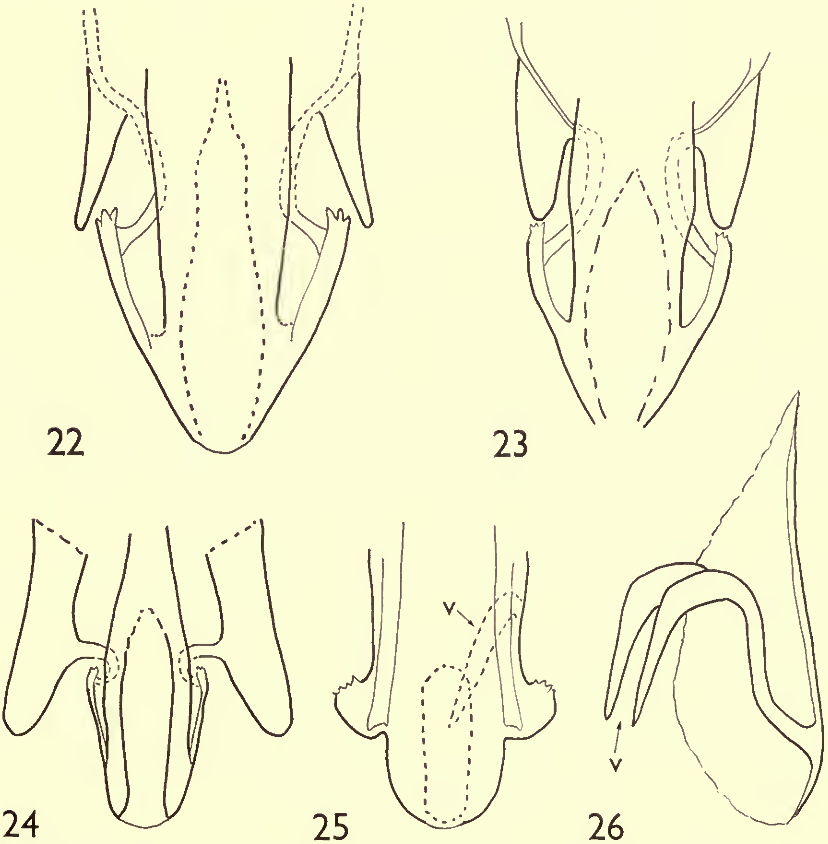


FIG. 21. *Myrsidea mirabilis*. ♀ dorsal.

by the pigmentation of sternite III; by the setae of tergum I being on the average fewer in number, shorter and spine-like, with only two long central setae; setae of tergum II between the lateral cluster and the two long central setae are shorter; sternite II has more setae which more often extend down the lateral edges each side. Post-spiracular seta VII in both sexes approximately the same as VIII, not shorter and finer as in *mirabilis*. In the male, sternites II, IV, V, VI average a greater number of anterior setae, post-spiracular seta VI is usually longer but there is some variation and the inner posterior setae of the last tergum average shorter. It is probable therefore that some of the males of this species will not be separable from those of *mirabilis*.

♀ and ♂. Gular setae: range 5–6 each side; $\bar{X}$ of total, ♀ (11) 10·5; ♂ (9) 10·3. Metapleural setae of ♀ average more than in *mirabilis*, range 4–6 each side, $\bar{X}$ of 20 sides 4·7. Setae of femoral brush: ♀, range 17–19, $\bar{X}$ (12) 18·3; ♂, range 13–16, $\bar{X}$ (8) 14·1. ♀ sterna IV–VI narrowed and arched as in *mirabilis*; pigmented part of sternite III appears as a narrow posterior strip medianly in ♀, (Pl. 4, fig. 3), in ♂ pigmented part of sternite III also indented centrally



FIGS. 22–26. ♂ genital sclerite. 22, *Myrsidea mirabilis*. 23, *M. downsi*. 24, *M. fuscomarginata* (from *Agelaius phoeniceus*). 25–26, *M. psittaci* (from *Scaphidura oryzivora*). 25, Dorsal view. 26, Lateral view. v, ventral arms. Magnification as in figs. 13–16.

but to a lesser extent and is not always different from the condition in the male of *mirabilis*. ♂ genital sclerite as in *mirabilis*.

Abdominal Chaetotaxy (Text-fig. 27 and Tables I–VI). Post-spiracular setae similar to those of *mirabilis*, but VI averages longer: ♂ *mirabilis*, 0·092–0·150, X̄ (13) 0·113 mm; *tropicalis*, 0·104–0·162, X̄ (11) 0·135 mm. Inner posterior setae of last tergum in ♂: *mirabilis*, 19–28 μ, X̄ (14) 23·3 μ; *tropicalis*, 10–18 μ, X̄ (12) 13·8 μ. Central marginal sternal setae of ♀ III–VI tend to be rather more numerous than in *mirabilis* and less widely spaced.

Material examined. From *Psarocolius angustifrons alfredi* (Des Murs), PERU: Tamborapa, 5 ♂, 10 ♀, 12.vii.1933; BOLIVIA: Rio Beni, 1 ♂, 2 ♀, 31.viii.1934. From *P. angustifrons sincipitalis* (Cabanis), COLOMBIA: Huila, 2 ♂, 2 ♀, 8.v.1952. From *P. a. angustifrons* (Spix), COLOMBIA: Caqueta, 1 ♂, 4 ♀, 6.vi.1952. From *P. a. salmoni* (Sclater), COLOMBIA: Rio Samana, 3 ♂, 1 ♀, 13 and 15.v.1951. All specimens collected by *M. A. Carriker*.

3 ♂, 8 ♀ from *Psarocolius wagleri*, COLOMBIA: La Guayacana, Narino, 25.vii.1957 (*M. A. Carriker*) appear to belong to this species.

Holotype ♀ in U.S. National Museum, Washington, from *Psarocolius angustifrons alfredi* (6961) from PERU: Tamborapa, 12.vii.1933.

Paratypes 4 ♂, 8 ♀ from the same host individual.

Myrsidea downsi **sp. n.**

(Pl. 3, fig. 4. Text-figs. 23, 28)

Type host: *Psarocolius decumanus insularis* (Dalmas).

This species is distinguished in both sexes from *mirabilis*, *tropicalis* and *laciniata* by the greater number of central metanotal setae; in the female by the large size of tergum I with the posterior margin W-shaped; in the male from *laciniata* by the usually shorter inner posterior setae of the last tergum and from *mirabilis* and *tropicalis* by the fewer anterior sternal setae. The ♂ genital sclerite (Text-fig. 23) is probably always shorter than that of *mirabilis*, but comparison is difficult as the posterior margin of the dorsal plate in these species is not clearly delineated. Characters in which this species resembles *mirabilis* are not repeated here.

♀ and ♂. Gular setae 4–5 each side, 1♂ with 5 + 6. Central setae of metanotum: ♀, 19–23, X̄ (4) 20·3; ♂ ,8–13, X̄ (9) 10·3; metasternal setae 3–5; metapleural setae: ♀, 4–5 each side, ♂, 3–4. Setae of femoral brush: ♀, 11–16, X̄ (8) 14·1; ♂, 10–14, X̄ (18) 12·1. ♀ subgenital plate with lateral indentation marking the end of sternite VII deeper than in the previous two species and resembles that of *laciniata* (Pl. 4, fig. 4. s.).

Abdominal Chaetotaxy (Text-fig. 28 and Tables I–VI). Post-spiracular setae VII somewhat shorter and finer than VIII but not so marked as in *mirabilis*. In both sexes sternite III has few anterior lateral setae: ♀, 0–1 and ♂, 1–2 each side; in table VI the median anterior setae are included with the laterals but sterna IV–VI have few median setae: 0–3. Lengths of setae of pleurite VIII as in *mirabilis*; inner posterior setae of last ♂ tergum: 20–34 μ, X̄ (10) 25·7 μ.

Material examined. TRINIDAD: Sangre Grande, 7 ♂, 4 ♀, 10.i.1961 (*T. Clay*, 6, 12). SURINAME: Paramaribo, 2 ♂, 1 ♀, 6.xii.1953 (*F. Haverschmidt*). BRAZIL: skin, no further data, 2 ♂, 2 ♀. COLOMBIA: Plato, 2 ♂, 24.i.1947 (*M. A. Carriker*, 9549); El Real, Antioquia, 1 ♂, 2 ♀, 5.iii.1948 (*M. A. Carriker*, 12703). PERU: Puerto Gessup, 1 ♂, 2.ii.1930 (*M. A. Carriker*, 990). All specimens from *Psarocolius decumanus*. The description is based on the Trinidad and Suriname specimens.

Holotype ♀ (slide No. 701) in British Museum (Natural History) from *Psarocolius decumanus insularis*, TRINIDAD: 10.i.1961 (*T. Clay*, No. 12).

Paratypes 7 ♂, 3 ♀ from the same host species, TRINIDAD (*T. Clay*, Nos. 6, 12).

The following specimens in poor condition from the same host species probably also belong to this species: TRINIDAD: Sta. Emilia, 5 ♂, 5 ♀, 4.viii.1910 (*M. A.*

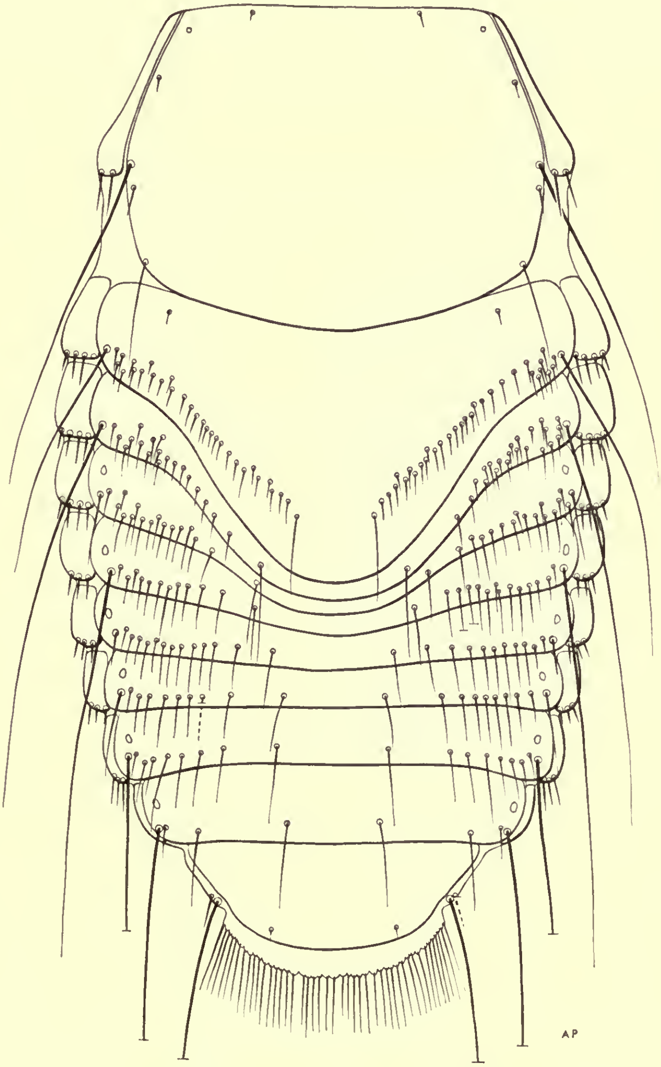


FIG. 27. *Myrsidea tropicalis*. ♀ dorsal.

Carriker). BOLIVIA: Chatatona, 3 ♂, 2 ♀, 28.ix.1934 (*M. A. Carriker*, 10296); Sta. Ana, 1 ♀ (*M. A. Carriker*, 9225).

This species is named in honour of Dr. Wilbur D. Downs, former Director of the Trinidad Regional Virus Laboratory.

Myrsidea laciniata **sp. n.**

(Pl. 4, fig. 4. Text-fig. 29)

Type host: *Cacicus u. uropygialis* (Lafresnaye).

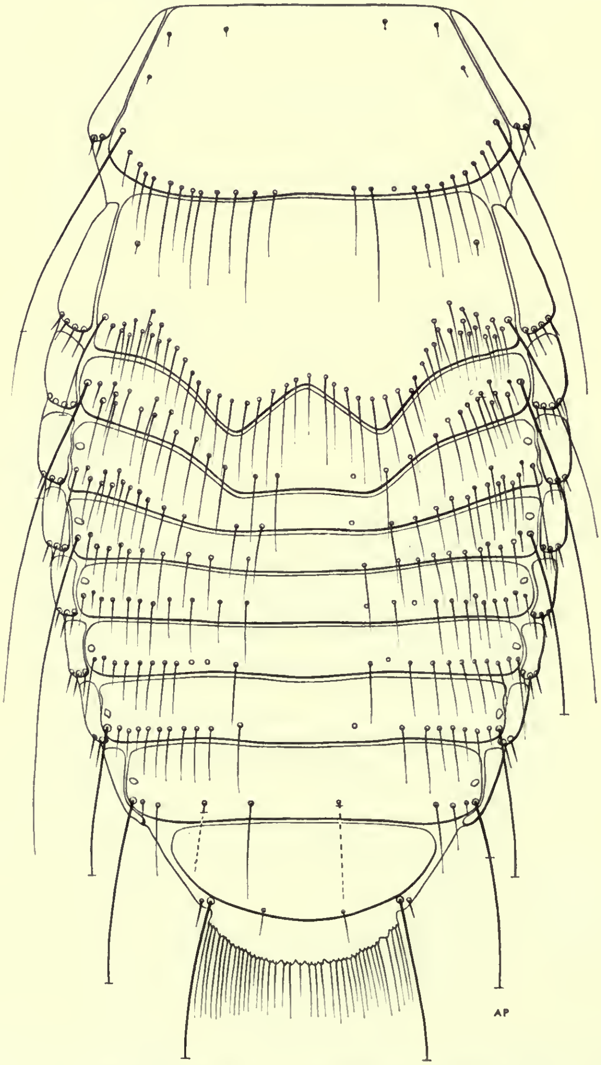


FIG. 28. *Myrsidea downsi.* ♀ dorsal.

This species is distinguished in the female from all others parasitic on the Icteridae by the partial fusion of terga II–VI. In the male it can be separated from the previous three species by the greater length of the inner posterior setae of the last tergum and from *mirabilis* and *tropicalis* by the fewer anterior sternal setae. The characters similar to those of *mirabilis* are given under that species.

♀ and ♂. Central setae of metanotum: ♀, 14–15, $\bar{X}$ (6) 14·5; ♂, 4–6; metasternal setae: 3 + 3; metapleural setae: ♀, 4–5 each side, ♂, 3 + 3. Setae of femoral brush: ♀, 11–17, $\bar{X}$ (13) 14; ♂, 11–16, $\bar{X}$ (5) 13·6. ♀ anterior terga with unpigmented areas and II–VI showing partial fusion (Text-fig. 29). ♀ subgenital plate as in *downsi*. (Pl. 4, fig. 4).

Abdominal Chaetotaxy (Text-fig. 29). Tergocentral setae: ♂, I, 13; II, 16; III, 12; IV, 15; V, 12; VI, 14; VII, 9; VIII, 6. Marginal setae of sternites: ♀ (5), II, 18–24, $\bar{X}$ 19·8; III, 18–26, $\bar{X}$ 20; IV, 17–20, $\bar{X}$ 17·4; V, 18–20, $\bar{X}$ 18·6; VI, 14–19, $\bar{X}$ 15·8; VII, 12–14, $\bar{X}$ 13·6; VIII–IX, 14–20, $\bar{X}$ 17·2; vulval, 12–15, $\bar{X}$ 13·2; the marginal setae of III, IV and sometimes V and

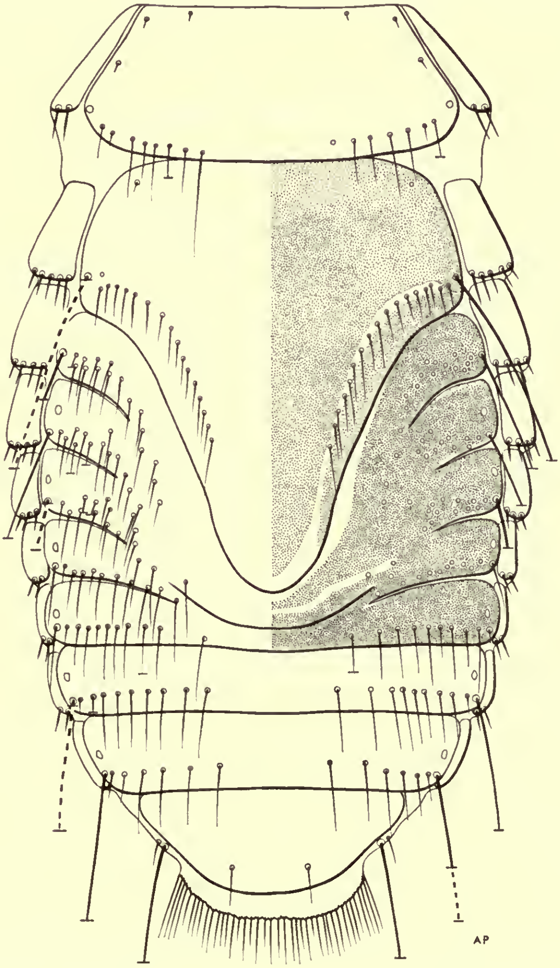


FIG. 29. *Myrsidea laciniata.* ♀ dorsal.

VI are in three well marked groups, a central one of a few setae and two lateral groups; in some specimens there may be a seta between the groups on one or both sides. ♂ (1) marginal setae of sternites: II, 14; III, 22; IV, 23; V–VI, 21; VII, 15; VIII, 6; IX, 10. Anterior setae of II: ♀ (4), 6–7, ♂ (1), 7. Lateral anterior sternal setae: ♀ (10 sides), III, 0; IV, 1–4, $\bar{X}$ 1·67; V, 2–4, $\bar{X}$ 2·8; VI, 1–5, $\bar{X}$ 2·8; VII, 1–3, $\bar{X}$ 1·7; sternum III has 1–6 anterior median setae. Lateral anterior sternal setae: ♂ (1), III, 0 + 0; IV, 2 + 2; V–VI, 4 + 4; VII, 2 + 2; VIII, 0 + 1; anterior median setae: III, 2–6; IV, 0–2; V, 0–2. Lengths of setae of pleurite VIII as in *mirabilis*; length of inner posterior setae of last ♂ tergum: 37–42 μ, $\bar{X}$ (4) 40·7 μ.

Material examined. 3♂, 10♀ from *Cacicus u. uropygialis*, PERU: Enenas, 11.iii. 1930 (*Carriker*, No. 1346); Tamborapa, 23.vii.1933 (*Carriker* No. 7121) and Chaupe, 23.vii.1933 (*Carriker* No. 7121)

Holotype ♀ in the U.S. National Museum from the type host, Enenas, Peru, 11. iii.1930.

Paratypes. 3♂, 7♀ from the same host species with data as given above.

Myrsidea balteri sp. n.

(Pl. 4, fig. 5. Text-figs. 9, 16, 30)

Type host: *Quiscalus mexicanus mexicanus* (Gmelin).

This species resembles *fuscomarginata* and *aquilonia* in having the peg-like seta of the maxillary palp and head seta 10 longer than in the preceding species and in the female by the unmodified tergum I and only sternite VI being arched and narrowed medianly. It is distinguished in the female by the modifications of terga II–IV and in the male by the proportions of the genital sclerite.

♀ and ♂. Hypopharynx fully developed. Peg-like seta of maxillary palp similar to that of *fuscomarginata*. Head seta 10 : 72–85 μ, subocular setae: ♀, 10–11; ♂, 9–11. Central setae of metanotum: 3–7 each side; total, ♀, 9–11, $\bar{X}$ (5) 10; ♂, 10–12, $\bar{X}$ (4) 10·8. Metapleural setae 3–4 each side. Setae of femoral brush: ♀, 13–18, $\bar{X}$ (14) 15·6; ♂, 12–14, $\bar{X}$ (6) 13·3. Only sternite VI arched and narrowed centrally (Pl. 4, fig. 5), sternal ratio II–VI : 100 : 83 : 61 : 52 : 23. ♂ genital sternite in Text-fig. 16.

Abdominal Chaetotaxy (Text-figs. 9, 30, Tables I–VI). Post-spiracular seta VI long and similar to VII. ♀ arrangement of sternal setae on III–VI similar to that of *diffusa*.

Material examined. From *Quiscalus mexicanus*.[2] U.S.A., FLORIDA: Pass-a-Grille, ("Boat-tailed Grackle"), 1 ♂, 1 ♀, 29.ii.1929 (*W. G. Fargo*), U.S.N.M. GEORGIA: Savannah ("Boat-tailed"), 3 ♂, 4 ♀, 10.viii.32 and 1934 (*I. R. Tomkins*), U.S.N.M. MISSISSIPPI: Pascagoula (*major*), 2 ♂, 4 ♀, 26.x.1941 (*G. G. Rohwer*), U.S.N.M. LOUISIANA: Chef Menteur (*major*), 3 ♂, 1 ♀, 15.x.1933, Cornell University; Phoenix ("Boat-tailed"), 1 ♂, 19.ii.1933 (*F. M. Carroll*), U.S.N.M. TEXAS: Galveston ("Boat-tailed"), 6 ♂, 3 ♀, 5.xi.1947 (*K. C. Emerson*), K.C.E. MEXICO: Victoria, Tamaulipas ("Great-tailed Grackle"), 3 ♂, 6 ♀, 23.iv.1931 (*R. A. Roberts*),

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[2] As *Quiscalus major* is sometimes considered as a subspecies of *Q. mexicanus* and sometimes as a full species, it is not always clear from the labels from which host the Mallophaga came; therefore all are recorded under *mexicanus* with the subspecific or vernacular name (in brackets), taken from the slide labels.

U.S.N.M.; Tlacotalpan, (*assimilis*), 1 ♂, 2 ♀, 9.ii.1940 (*M. A. Carriker*), U.S.N.M.; no further locality (skin), (*macrurus*), 4 ♂ (*R. Meinertzhagen*), B.M. HONDURAS: Roatan Is. (skin), (*macrurus*), 1 ♂, 3 ♀, 1886 (*R. S. Balter*), B.M. COLUMBIA: Bolivar (*assimilis*), 4 ♂, 5 ♀, 8.i.1950 (*M. A. Carriker*), U.S.N.M.

Holotype ♀ in the British Museum (Natural History), slide No. 700, from *Quiscalus mexicanus* (Gmelin), HONDURAS: Roatan Is.

Paratypes: 1 ♂, 4 ♀ from type host individual and 3 ♂, 6 ♀ from MEXICO: Victoria, Tamaulipas, as above.

This species is named in honour of Mr. R. S. Balter, who collected some of the type material from a B.M. (N.H.) skin.

Myrsidea fuscomarginata (Osborn, 1896)

(Pl. 1, figs. 7–8; Pl. 2, figs. 1, 5. Text-figs. 1–3, 7, 24, 31)

Type host: *Turdus minor*. Error.

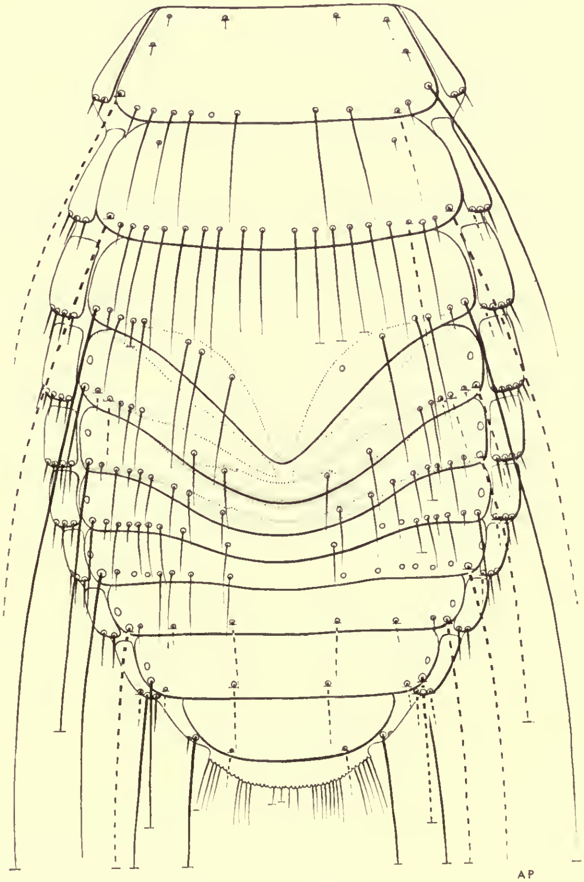


FIG. 30. *Myrsidea balteri*. ♀ dorsal.

Menopon fuscomarginatum Osborn, 1896 : 245. Host: *Turdus minor.*

Through the kindness of Dr. P. J. Darlington it has been possible to examine the type series in the Museum of Comparative Zoology (Cambridge, Mass.), as listed by Emerson, 1960 : 160. The characters of the male genitalia confirm the placing by Stafford (1943 : 40) of this species with others from the Icteridae, but it is not a synomym of *diffusa* as suggested by him. There are a number of Icterid hosts parasitized by forms similar to the *fuscomarginata* types, differing slightly from these and from each other; available specimens from *Agelaius phoenicius* (Linn.) seem to agree most closely with the original specimens and it is possible that these were stragglers from one of the subspecies of this host. Part of the following description (in square brackets) is based on specimens from *A. phoeniceus.*

This species and *M. aquilonia* resemble each other in the characters of the peg-

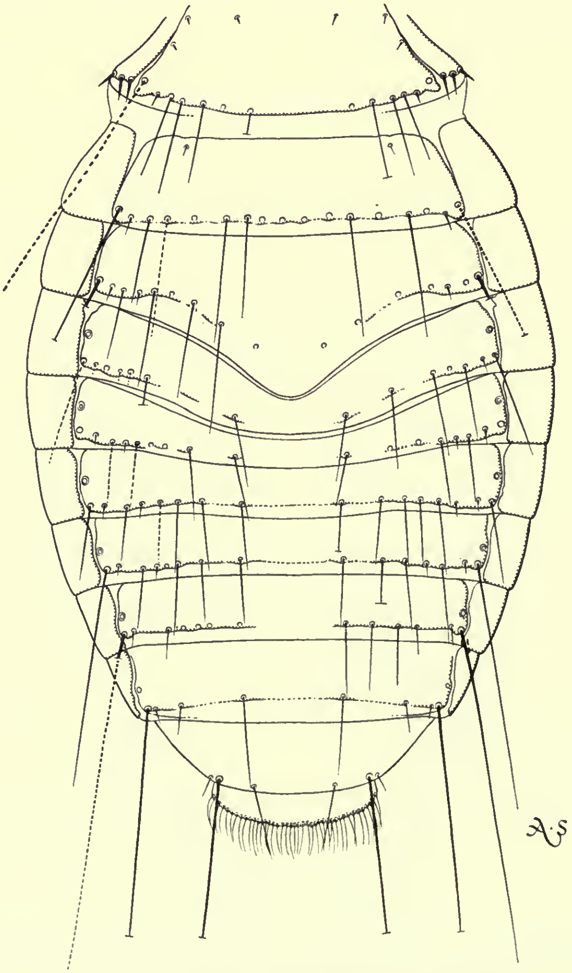


FIG. 31. *Myrsidea fuscomarginata.* ♀ dorsal.

like seta of the maxillary palp, head seta 10, ♀ sterna, the unmodified ♀ tergum I, post-spiracular seta VI and the ♂ genital sclerite. The differences between the two species are given below under *aquilonia*.

♀ and ♂. Hypopharynx fully developed. Peg-like seta of maxillary palp longer than in *diffusa* (Pl. 1, fig. 7); head seta 10 longer [70–80 μ]; subocular setae: 9–11 [$\bar{X}$ (8), 10]; gular setae 4–5. Central setae of metanotum: ♀, 6 + 5, [4–6 each side, $\bar{X}$ of total (4) 9·7]; ♂, 5 + 5 [4–5 each side (2)]; metasternal setae [3 + 3]; metapleural setae [2–4 each side]. Setae of femoral brush ♀ [13–16, $\bar{X}$ (10) 14·2]; ♂, [11–14, $\bar{X}$ (10) 12·6]. ♀ sterna III–V similar and only VI narrowed medianly and arched, sternal ratio II–VI [100 : 79 : 65 : 57 : 33]. ♂ genital sclerite as in Text-fig. 24.

Abdominal Chaetotaxy (Text-figs. 7, 31 and Tables I–VI). Post-spiracular seta VI relatively longer than in previous species, but shorter than VII. The inner of the three setae of pleurite VIII is usually longer, not of approximately the same length as in previous species. ♀ sterna III—VI without marked gap between central and lateral marginal setae.

Material examined. Lectotype ♂, paratypes 2 ♂, 3 ♀ from "*Turdus minor*". 9 ♂, 15 ♀ from *Agelaius phoeniceus* (Linn.) as follows: U.S.A.: Georgia, Prairie, 1 ♀, 15.vi.1929 (*F. Harper*), E.C.; Mississippi, Tibbee, 2 ♀, 22.ii.1936 (*T. Brackin*), E.C.; Mississippi, Handsboror, 2 ♀, 15.x.1941 (*G. G. Rohwer*), U.S.N.M.; Texas, Galveston, 5 ♂, 4 ♀, 5.xi.1947 (*K. C. Emerson*), E.C.; Louisiana, New Orleans, 4 ♂, 6 ♀, iv.1938 (*R. Meinertzhagen*, 11204), B.M.

3 ♀ from *Molothrus* (= *Tangavius*) *aeneus* (Wagler) agree with the above description except that the sitophore sclerite is somewhat reduced and post-spiracular setae III and V are longer than shown in Text-fig. 31. Data for these specimens: TEXAS: Nacogdoches, 30.xii.1952 (Paramlee), E.C.

Specimens from *Quiscalus quiscula* (Linn.) also show the reduced sitophore sclerite and the tergal setae of the males average more. Specimens examined: KANSAS: Linn. Co., 3 ♀, 9.xi.1949 (*V. I. Miles*), B.M. S. CAROLINA: Charleston, 3 ♂, 3 ♀, 5.i.1933 (*H. S. Peters*), U.S.N.M. FLORIDA: Alachua Co., 3 ♂, 1 ♀, 6, 7, iii.1954 (*F. W. Mead*), K.C.: Tarpon Springs, 1 ♀, 29.i.1929 (*W. G. Fargo*), U.S.N.M. MISSISSIPPI: Greenville, 6 ♂, 6 ♀, 28.xi.1937 (*O. Ballard*), Cornell University.

Specimens from *Holoquiscalus niger* and *H. lugubris* belong to the *fuscomarginata* group, but those from the two hosts show some differences from each other and from those parasitic on *A. phoenicius*; the sitophore sclerite is not reduced. Data of the specimens: From *Holoquiscalus niger brachypterus* (Cassin), PORTO RICO: Mayaquez, 3 ♂, 2 ♀, 9, 11.v.1936 (*H. L. Dozier*), U.S.N.M. From *H. l. lugubris* (Swainson), TRINIDAD: Port-of-Spain, 2 ♀, 1.ii.1956 (*W. G. Downs*, TRVL. 97), U.S.N.M.

It is apparent that until the full distribution and variation within the *fuscomarginata* groups of populations are known, little is gained by separating taxonomically the specimens showing slight differences.

Myrsidea aquilonia sp. n.

(Pl. 1, fig. 3; Pl. 2, figs. 2, 4. Text-fig. 32)

Type host: *Euphagus carolinus* (P.L.S. Muller).

This species is similar to *fuscomarginata*, from which it can be distinguished in the female by the characters of the anterior terga; the males may not be distinguishable, although in the available material post-spiracular seta VI appears to be longer than that of *fuscomarginata*. The reduction of the sitophore sclerite of the hypopharynx is also found in some of the populations discussed under *fuscomarginata*.

♀ and ♂. Sitophore sclerite reduced (Pl. 2, fig. 2). Head seta 10 : 72–97 μ. Metapleural setae: 3–4, $\bar{X}$ (20) 3·1. ♀ sterna similar to those of *fuscomarginata*, with only VI narrow and arched; sternal ratio II–VI, 100 : 67 : 67 : 62 : 47. Measurements and number of abdominal setae fall within the range of those of *fuscomarginata*.

Material examined. 4 ♂, 9 ♀ from *Euphagus carolinus* (P. L. S. Muller) as follows: U.S.A.: State College, Mississippi, 4 ♂, 7 ♀, 22.i.1939 (*E. W. Stafford*), E.C.; Cornell University, 2 ♀ (*E.W.S.*), no other data.

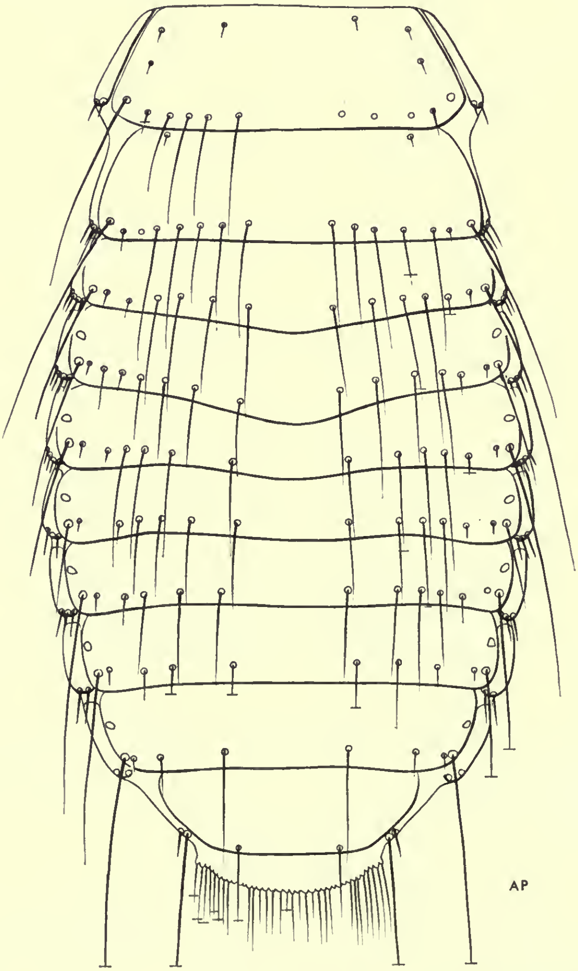


FIG. 32. *Myrsidea aquilonia*. ♀ dorsal.

Holotype ♀ in Emerson Collection from *Euphagus carolinus*, State College, Mississippi as above.

Paratypes. 4 ♂, 8 ♀ with data as given above.

Myrsidea psittaci Carriker, 1955

(Pl. 2, figs. 3, 6; Pl. 4, fig. 6. Text-figs. 10, 25–26, 33)

Type host: *Amazona o. ochrocephala*. Error. Possibly *Scaphidura oryzivora* (Gmelin).

Myrsidea psittaci Carriker, 1955 : 38, figs. 3, 4. Host: *Amazona o. ochrocephala*.

This species was based on 1 ♂, 1 ♀ of the 5 ♂, 8 ♀ recorded by Stafford (1943 : 40) as *Myrsidea diffusa* (Kellogg) from *Amazona ochrocephala* in Venezuela. Through the kindness of Dr. K. C. Emerson it has been possible to examine 3 ♂, 6 ♀ from the Stafford series, and although tergite III of the females is not quite as figured by Carriker (1955, fig. 3) there seems little doubt that these specimens are topotypes of *psittaci*. Carriker considered that the parrot recorded by Stafford was the true host, but the specimens have the bursa and ♂ genital sclerite typical of the Icterid-

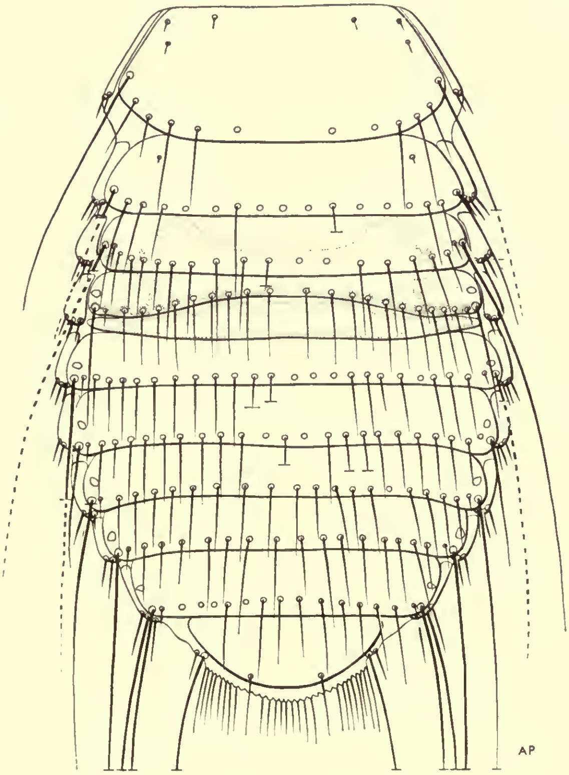


FIG. 33. *Myrsidea psittaci*. ♀ dorsal.

infesting species. Further, there appears to be no significant differences between the Stafford specimens and those from *Scaphidura* (= *Psomocolax*) *oryzivora*, an Icterid also found in Venezuela; it seems possible therefore that the original specimens had straggled from this host.

This species resembles *M. comosa* n. sp. and differs from other known species from the Icteridae by the greatly reduced sitophore sclerite of the hypopharynx, the presence of one or more anterior seta on at least one pleurite and the basal apodeme of the ♂ genitalia. It differs from *comosa* in the ♀ by the form of the metanotum and anterior terga; in the ♂ by the characters of the genital sclerite and in both sexes by the smaller number of anterior pleural setae.

♀ and ♂. Sitophore sclerite of hypopharynx absent in its usual form (Pl. 2, fig. 3); epipharyngeal crest greatly reduced. Peg-like seta of maxillary palp similar in length to that of *fuscomarginata*. Head seta 10, medium (56–64 μ); subocular setae: ♀, 10; ♂, 9–10; gular setae 4–5 each side. Central setae of metanotum see below; metasternal setae 4–5 each side; metapleural setae 3–4 each side. Setae of femoral brush see below. ♀ sterna III–VI similar and not greatly arched or narrowed medianly (Pl. 4, fig. 6). Posterior arm of basal apodeme of ♂ genitalia as Pl. 2, fig. 6; genital sclerite in Text-figs. 25–26.

Abdominal Chaetotaxy (Text-figs. 10, 33 and Tables I–VI). Post-spiracular seta VI long and stout. The sternites in both sexes do not have a definite row of anterior median setae but may, especially in the males, have one or two setae somewhat removed centrally from the lateral brushes. Marginal sternal setae of ♀ III–VI not divided into definite central and lateral groups. Pleurite IV has from 0–1 anterior seta; V–VII, 1–2 (0–2 in ♂) and VIII, 0–1.

Material examined. 3 ♂, 6 ♀ topotypes of *M. psittaci* from *Amazona ochrocephala*, VENEZUELA: Oramas, 25.iii.1938. E.C. From *Scaphidura oryzivora*, COLOMBIA: Regeneracion, Bol., 14 ♀, 20.ii.1948 (*M. A. Carriker*, 12633), U.S.N.M.; Casarcara, Magdalena, 1 ♂, 2 ♀, 18.v.1942 (*M. A. Carriker*, 2754), U.S.N.M.; Chirua, 2 ♂, 2 ♀, 10.iii.1914 (*M. A. Carriker*, 14310), U.S.N.M.; Nuqui, Choco, 1 ♀, 17.ii.1951 (*M. A. Carriker*, 19635), U.S.N.M.; BOLIVIA: Chatarona, 3 ♂, 7 ♀, 21.ix.1934 (*M. A. Carriker*, 10136), U.S.N.M.

Specimens from *Agelaius icterocephalus* are smaller, head seta 10 is shorter (40–48 μ), some of the setal counts are less, see below for those of the central setae of the metanotum and third femur; the number of tergocentral and lateral anterior sternal setae average less, but the range falls near or within that of the *psittaci* topotypes and the specimens from *Scaphidura*. The range and mean of the total number of anterior pleural setae of the abdomen in the ♀ typotypes: 7–12, $\bar{X}$ (5) 9·8; in specimens from *Scaphidura*, 6–12, $\bar{X}$ (6) 9·5; those from *A. icterocephalus*, 1–6, $\bar{X}$ (6) 3·8 and for the males: 9(1); 7–11, $\bar{X}$ (3) 9; 1–7, $\bar{X}$ (13) 3·4. It is possible that other populations belonging to the *psittaci* group will be found, perhaps with intermediate measurements and counts, and as there is overlap even in the small amount of material examined it seems more satisfactory to retain the *Agelaius*-infesting population as *psittaci* sens. lat.

Material examined from *Agelaius icterocephalus* (Linn.), TRINIDAD: San Juan, 1 ♀, 19.x.1959 (*T. H. G. Aitken*, TRVL 3313), Biche, 9 ♂, 13 ♀, 17.vi.1966 (*Aitken*, TRVL 4530); La Paille, 3 ♂, 3 ♀, 9.xi.1960 (*Aitken*, TRVL 5091); N. Trinidad, 4 ♂, 1 ♀, 18.i.1961 (*T. Clay*, No. 55).

	♀				♂			
	Metanotal Setae		Femoral Brush		Metanotal Setae		Femoral Brush	
	Range	Mean	Range	Mean	Range	Mean	Range	Mean
A.	10–13	11·2 (5)	16–17	16·8 (8)	10–11	10·7 (3)	12–16	14·2 (4)
B.	10–14	12 (5)	15–21	16·9 (14)	10–12	11 (2)	14–16	14·7 (4)
C.	5–10	7·3 (11)	12–14	12·8 (10)	7–9	8·3 (13)	10–13	11·1 (10)

A. Stafford's specimens of *psittaci*; B. From *Scaphidura oryzivora*;
C. From *Agelaius icterocephalus*.

Myrsidea comosa sp. n.

(Pl. 2, fig. 7; Pl. 3, figs. 5–6. Text-figs. 4, 6, 34, 35, 37)

Type host: *Macroagelaius subalaris subalaris* (Boissoneau).

This species is at once distinguished from any other known species parasitic on the Icteridae by the many anterior setae on pleurites II-VIII in both sexes and in the male by the anterior median and lateral setae on tergites II-VIII and the genital sclerite. Of the known species, it resembles most nearly *psittaci*, as shown above under that species.

♀ and ♂. Hypopharynx fully reduced as in *psittaci*; peg-like seta of maxillary palp as in *psittaci*. Head seta 10 short (44–54 μ); subocular setae 9–10; gular setae: 5–6 each side, total 10–12, $\bar{X}$ (6) : 10·8. There is an additional short seta present on both the lateral margins of the prothorax on two of the males and one of the females and on one side of one female. The outer long seta of the metanotum usually has a short or sometimes spine-like seta on its inner side, both being some way anterior to the rest of the marginal setae, this shorter seta is included in the counts of the central setae to conform with the other species. Central setae of metanotum: ♀, 6–8 each side, total 13–15, $\bar{X}$ (4) 14; ♂, 5–7 each side, total 12; metapleural setae 3–4; metasternal setae: ♀, 5 + 5, ♂ (2), 4 + 4, 5 + 4. Setae of femoral brush: ♀, 15–19, $\bar{X}$ (7) 17·1; ♂, 15–18, $\bar{X}$ (4) 16·7. None of the ♀ sternites greatly narrowed or arched (Pl. 3, fig. 6), sternal ratio II—VI, 100 : 88 : 83 : 83 : 88. Microtrichia of genital chamber longer than in other species and not arranged in combs (cf. Clay, 1966, fig. 24 and Text-fig. 6). It has been possible to see the bursa copulatrix in only one specimen; it is inconspicuous, thin-walled and distorted, but appears to be of the same general type as that of the previous species. The male genitalia resemble those of *psittaci* in having the inwardly projecting posterior arm of the basal apodeme angulated (Pl. 2, fig. 7 a.), the thorn-like projection at the tip of the paramere is larger than in *psittaci* and the parameres are longer. The genital sclerite differs from all other known species in being larger and having long narrow posterior arms; what may be the ventral arms, are narrow, seem to be flattened and to lie on the ventral surface of the plate (Text-fig. 35).

Abdominal Chaetotaxy. (Pl. 3, fig. 5; Text-figs. 34, 37 and Tables I-VI). Post-spiracular seta VI long, shorter than VII but similar in thickness. Anterior lateral setae of ♀ tergites (excluding post-spiracular setae and the short spine-like seta associated with it): I (4), 0; II, 1–3 each side; III, 3–6; IV, 5–8; V, 4–6; VI, 2–7; VII, 2–5; VIII, 0–1. Anterior lateral and median setae of ♂ tergites (excluding setae as in ♀): I (2), 0; II, 9–10 (total anterior setae for segment); III, 26–28; IV, 30–35; V, 31–34; VI, 33–35; VII, 35–37; VIII, 25–26. Sternal setae: in both sexes sternites III–VIII with anterior median setae, in the tables these are included with the lateral brushes as they cannot always be separated; in ♀, marginal setae are continuous with those of the lateral brushes. Anterior setae of pleurites: ♀ see Text-fig. 37; on one side of 1 ♂: II, 8; III–IV, 20; V, 21; VI, 19; VII, 20; VIII, 11. In most specimens either the inner or outer marginal setae of pleurite VIII is missing, where they are both present, the inner is the longer one.

Material examined. From *Macroagelaius s. subalaris* (Boissonneau), COLOMBIA: Fusagasuga, 1 ♂, 3 ♀, v. 1890 (skin, *T. Clay*), B.M.; Las Vegas, Santander, 1 ♂, 1 ♀, 29.viii.1949 (*M. A. Carriker*), U.S.N.M. From *Macroagelaius subalaris imthurni* (Sclater), BRITISH GUIANA, Roraima, 2 ♂, x. 1883 (skin, *T. Clay*), B.M.

Holotype ♀ in British Museum (Natural History), slide No. 702, from *Macroagelaius s. subalaris*, COLOMBIA: Fusagasuga (as above).

Paratypes: 2 ♂, 3 ♀ from *M. s. subalaris*, COLOMBIA with above data.

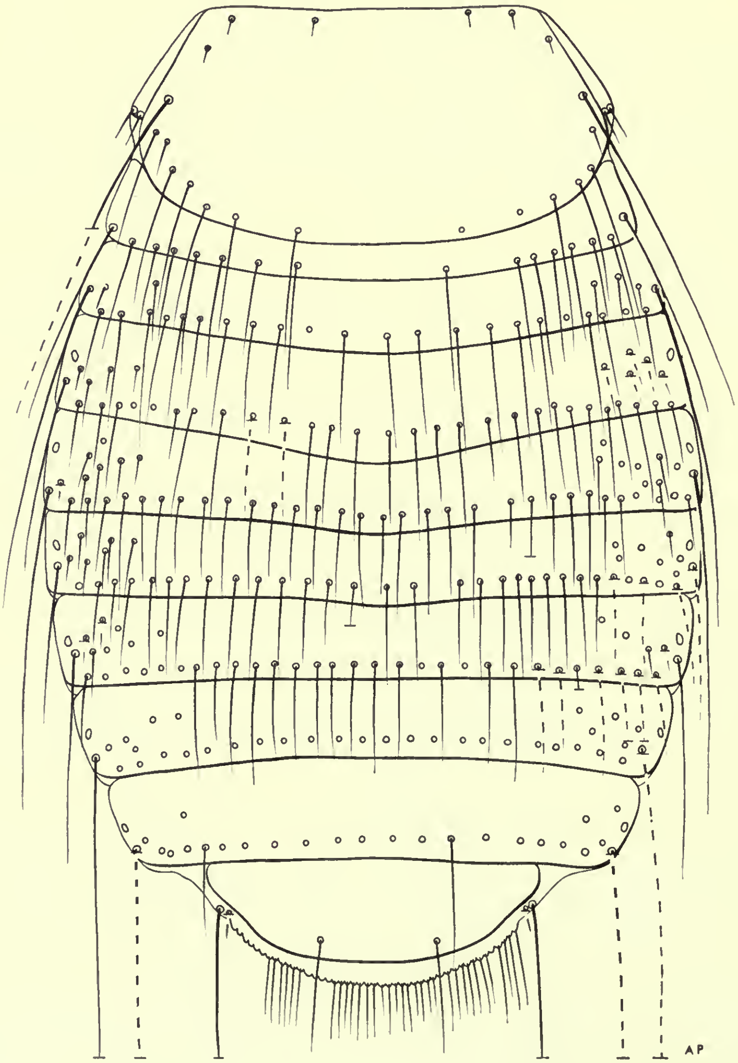
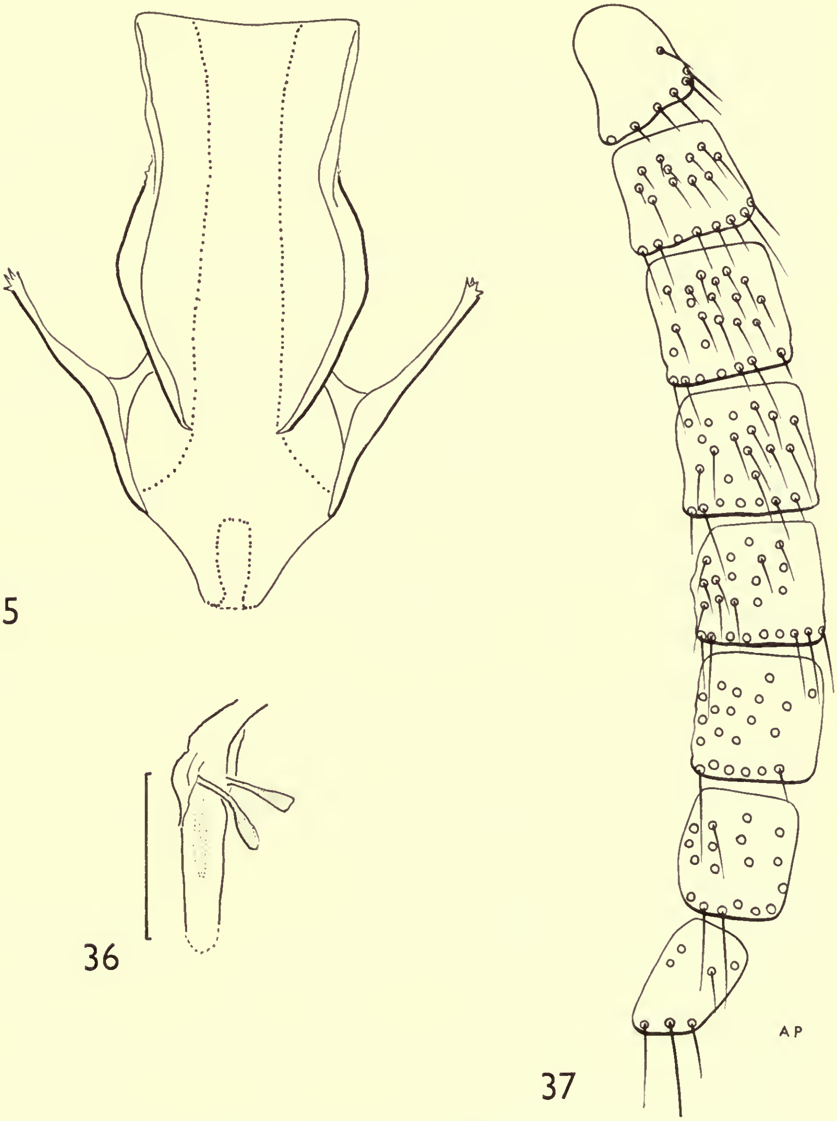


FIG. 34. *Myrsidea comosa*. ♀ dorsal.

KEY TO THE SPECIES OF *Myrsidea* PARASITIC ON THE ICTERIDAE

1 Sitophore sclerite of hypopharynx undeveloped (Pl. 2, fig. 3); inwardly projecting posterior arm of ♂ basal plate angulated (Pl. 2, fig. 6) [P. sp. seta VI long and stout] 2

– Sitophore sclerite of hypopharynx developed (Pl. 2, figs. 1–2); inwardly projecting posterior arm of ♂ basal plate rounded (Pl. 2, fig. 5) . . . 3



FIGS. 35–37. 35–36, ♂ genital sclerites. 35, *Myrsidea comosa* (length: 0·14 mm); posterior outline doubtful. 36, *M. bonariensis*. Reconstruction of distal end from distorted specimen, outline of posterior margin doubtful, line = 3 μ. 37, *M. comosa*. ♀ pleurites.

2 (1) Some tergites with over 6 anterior setae; pleurite IV with over 10 anterior setae; ♂ genital sclerite characteristic (Text-fig. 35) . . . . ***comosa***
– Tergites without anterior setae; pleurite IV with less than 5 anterior setae; ♂ genital sclerite not as above (Text-fig. 25) . . . . . . ***psittaci***
3 (1) Tibia I with over 8 outer dorso-lateral setae. [Metanotum with continuous row of over 16 marginal setae and tergite VIII with over 10 tergocentral setae] . . . . ***magnidens***
– Tibia I with under 6 outer dorso-lateral setae 4
4 (3) Females 5
– Males 13
5 (4) Tergum I normal, with straight posterior margin; only sternite VI significantly narrowed and arched medianly (Pl. 4, fig. 5) 6
– Tergum I modified without straight posterior margin; more than one sternite narrowed and arched medianly 8
6 (5) Tergum V narrowed medianly and with strongly convex posterior margin (Text-fig. 30) . . . . ***balteri***
– Tergum V not narrowed medianly and without convex posterior margin . 7
7 (6) Tergum II longer than I; tergum III narrowed medianly (Text-fig. 31) ***fuscomarginata***
– Tergum II shorter than I; tergum III not narrowed medianly (Text-fig. 32) ***aquilonia***
8 (5) Tergum I not greatly enlarged, with gently rounded posterior margin; tergum II broadened medianly (Text-fig. 11) . . . . ***diffusa***
– Tergum I greatly enlarged and medianly prolonged posteriorly; tergum II not as in *dlffusa* 9
9 (8) Terga II–IV fused together medianly (Text-fig. 29) . . . . . . ***laciniata***
Terga II–IV not fused together medianly 10
10 (9) Tergum I with posterior margin flattened or slightly concave without continuous row of submarginal setae (Text-fig. 17) . . . . . . ***picta***
— Tergum I otherwise 11
11 (10) Posterior margin of tergum I W-shaped and of II, flattened centrally (Text-fig. 28) . . . . ***downsi***
— Posterior margin of tergum I and II rounded 12
12 (11) Submarginal setae of tergum I mostly short, with 1 central pair of longer setae (Text-fig. 27) . . . . ***tropicalis***
— Submarginal setae of tergum I more numerous and longer (Text-fig. 21) ***mirabilis***
13 (4) At least one sternite of III–VI, with anterior median setae; genital sclerite characteristic (Text-figs. 22–23) 14
— Sternites III–VI without median anterior setae; genital sclerite not as above 16
14 (13) Central setae of metanotum less than 7 (4–6) 15
— Central setae of metanotum over 7 ($\bar{X}$, 10·3) . . . . ***downsi***
15 (14) Inner dorsal setae of last tergum over 35 μ . . . . ***laciniata***
— Inner dorsal setae of last tergum under 30 μ . . ***mirabilis & tropicalis***
16 (13) Tergal setae numerous, minimum total on tergites I–VIII : 145; VII : 17–20; VIII : 12–17 (6 ♂) . . . . ***picta***
— Tergal setae less numerous, maximum total on tergites I–VIII : 97–108; VII : 8–10; VIII : 4–6 17
17 (16) Head seta 10 under 50 μ; post-spiracular seta VI short, approximately = III; genital sclerite Text-fig. 13 . . . . ***diffusa***
— Head seta 10 over 70 μ; post-spiracular seta VI long, at least twice III; genital sclerite (Text-figs. 16, 24) 18
18 (17) Genital sclerite as in Text-fig. 16 . . . . ***balteri***
— Genital sclerite as in Text-fig. 24 . . . ***fuscomarginata & aquilonia***

HOST—PARASITE LIST

*Type host

HOST	*Myrsidea* Species	*Page No.*
Psarocolius		
**P. decumanus*	*M. downsi* sp. n .	218
**P. angustifrons*	*M. tropicalis* sp. n	216
**P. wagleri*	*M. mirabilis* (Carriker, 1903)	214
P. bifasciatus	*M. mirabilis* (Carriker, 1903)	214
Cacicus		
**C. cela*	*M. picta* Carriker, 1955	211
**C. uropygialis*	*M. laciniata* sp. n.	220
**C. holosericeus*	*M. diffusa* (Kellogg, 1899)	209
Molothrus		
M. aeneus	*M. fuscomarginata* (Osborn, 1896), sens. lat.	223
Scaphidura		
S. oryzivora	*M. psittaci* Carriker, 1955	227
Macroagelaius		
**M. subalaris*	*M. comosa* sp. n.	229
Quiscalus		
**Q. mexicanus*	*M. balteri* sp. n.	222
Q. major	*M. balteri* sp. n.	222
Q. quiscula	*M. fuscomarginata* (Osborn, 1896), sens. lat.	223
Q. niger	*M. fuscomarginata*, sens. lat.	223
Q. lugubris	*M. fuscomarginata*, sens. lat.	223
Euphagus		
**E. carolinus*	*M. aquilonia* sp. n.	225
Agelaius		
A. phoeniceus	*M. fuscomarginata* (Osborn, 1896)	223
A. icterocephalus	*M. psittaci* Carriker, 1955, sens. lat.	227
Host unknown	*M. magnidens* Stafford, 1943	212

THREE NEW WORLD SPECIES OF *Myrsidea*

1. **Myrsidea luroris** (Carriker, 1903).

Colpocephalum luroris Carriker, 1903 : 174, fig. Host: *Zarhynchus wagleri*. Error.

Through the kindness of the late Mr. M. A. Carriker it has been possible to examine the single specimen on which the description of *luroris* was based. This is a female in poor condition with most of the setae missing or broken; it appears to belong to the group parasitic on the Hirundinidae, agreeing in the shape of the head, the medianly divided mesonotum and the presence of 4 marginal setae on pleurite VIII. In size and in those characters which can be compared this specimen resembles *dissimilis* (Kellogg). It is possible that the specimen came from the *Stelgidopteryx ruficollis* collected at the same place and in the same month and year, no day is given so there is a possibility that they were collected on the same day. 1 ♂, 1 ♀ specimens from this host were described as *palloris*, but this may prove to be inseparable from *dissimilis* when more material is available for study.

2. *Myrsidea bonariensis* Malcomson, 1929.

(Pl. 1, fig. 5; Pl. 3, fig. 2. Text-figs. 36, 38, 39)

Type host: Probably a member of the *Thraupidae.*

Myrsidea bonariensis Malcomson, 1929 : 728, fig. 1. Host: *Molothrus bonariensis* (Cabaris). Error.

This species was based on a male and a female taken from a skin of *Molothrus bonariensis.* Through the kindness of Dr. Lewis J. Stannard of the Illinois Natural History Survey, it has been possible to examine these types.

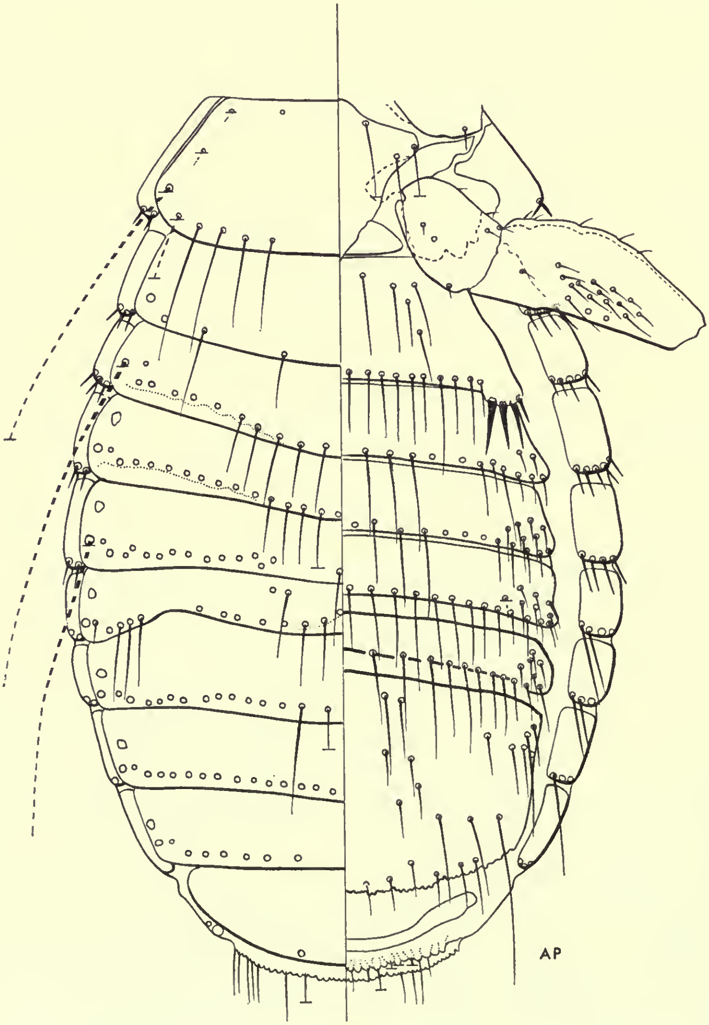


FIG. 38. *Myrsidea bonariensis.* ♀.

♀ and ♂. Head as in Pl. 3, fig. 2. Hypopharynx fully developed. Many of the head setae are broken or missing; seta 10 is probably markedly shorter than 11, but only 10 (30 μ) is measurable in the ♀, and only 11 (96 μ) in ♂. Setae of subocular comb row: ♀, 10 + 10, ♂, 9 + 10; gular setae: 5 + 4. Pronotum with 3 + 3 long setae on posterior margin. Central setae of metanotum: ♀, 5 + 5; ♂, 6 + 5; metasternal setae: 3 + 3; metapleural setae 3 + 3, short and spine-like. Outer dorso-lateral setae of first tibia: 4 + 4. Setae of femoral brush: ♀, 17 + 16; ♂, ? + 17. Sterna VII–IX of the female are deformed on the right side; the shape of tergum V is also probably due to deformation. Microtrichia of genital chamber as in *abidae* (Clay, 1966, fig. 23); bursa copulatrix ovate with thickened rim (Pl. 1, fig. 5). The genital sclerite in the single male is distorted and lying on its side, but is of the same type as found in the *thoracica* group (Text-fig. 36).

Abdominal Chaetotaxy. In the ♀ all the post-spiracular setae are missing except for II and IV and in the male except for I and III. Setae as shown in text-figs. 38, 39; spine-like setae of asters on sternite II: ♀, 4 + 4; ♂, 4 + 3; vulval setae 12; ♂ with 4 terminal setae and 8 internal anal setae.

Material examined. Holotype ♀, allotype ♂.

Discussion. It seems most probable that the type specimens of *bonarienses* did

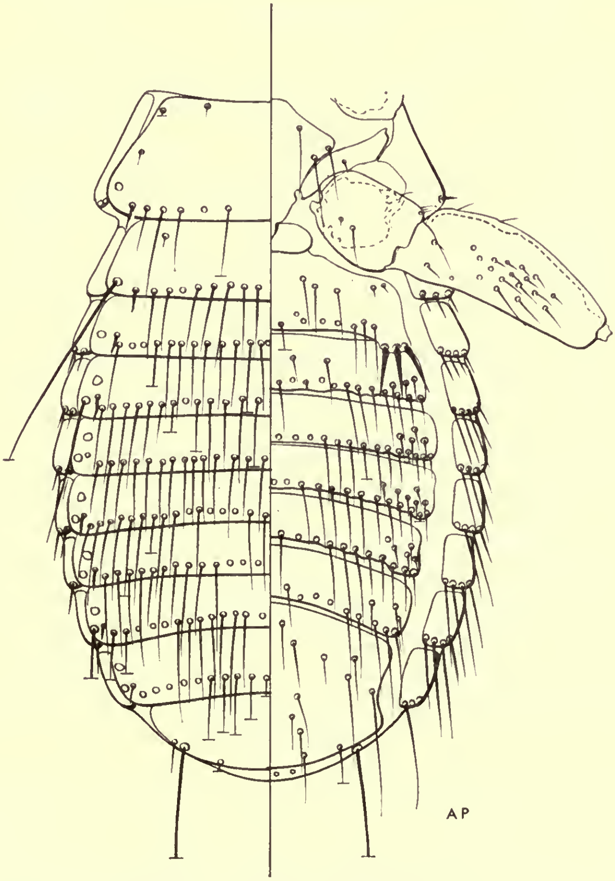


FIG. 39. *Myrsidea bonariensis*. ♂.

not originate from *Molothrus*, not only are specimens from this host different, but the bursa copulatrix and ♂ genital sclerite of *bonariensis* are unlike these structures in any of the known *Myrsidea* from the Icteridae. New World bird families parasitized by species of *Myrsidea* having a bursa copulatrix similar to that of *bonariensis* are rather numerous and include the Turdididae, Fringillidae, Parulidae, Mimidae, Thraupidae and Tyrannidae. The host of *bonariensis* was given as '*Molothrus bonariensis* (Cabanis), the Argentine cowbird. The skin bears no data'. *Molothrus bonariensis* (Cabanis) is a synonym of *M. bonariensis* (Gmelin) and it can be assumed that the specimen came from the Argentine; if the two types are stragglers therefore, presumably they also came from the Argentine. Specimens of *Myrsidea* from *Calopsiza* (= *Tangara*) *mexicana*, *C. gyrola* and *Tanagra violacea* collected in Trinidad by Dr. W. G. Downs and Dr. T. H. G. Aitken, all appear to be conspecific and to be sufficiently similar to the types of *bonariensis* to be included in that species, if it is presumed that tergite V of the type female is deformed. It seems therefore probable that the true host of *bonariensis* is one of the Argentine Thraupidae.

MEASUREMENTS

	♀		♂	
	Length	Breadth	Length	Breadth
1		0·34		0·31
Head	0·30		0·28	
2		0·45		0·41
Prothorax		0·31		0·28
Metanotum		0·42		0·34
Abdomen	0·77	0·57	0·59	0·44
Total	1·39		1·21	

3. *Myrsidea imbricata* (Neumann, 1891).

(Pl. 3, fig. 3. Text-figs. 40, 41)

Type host: *Chlorolampis elegans* (?). Probably error.

Menopon imbricatum Neumann, 1891 : 91, fig. 7. Host: *Chlorolampis elegans* (?).

This species was described from a single female said to have been taken from '*Chlorolampis elegans* (?)'. In the Laboratoire de Parasitologie, École Nationale Vétérinaire de Toulouse there is a female *Myrsidea* on a slide labelled '*Menopon imbricatum* Nn. Sur l'Oiseau-mouche. *Chlorolampis sp. elegans* (?). Antilles'; through the kindness of Professor Brizard it has been possible to examine this specimen. The figure given by Neumann, together with the labels on the slide, leave no doubt that this is the type of *imbricatum*.

♀. Head as in Pl. 3, fig. 3. Hypopharynx fully developed. Many of the head setae are broken or missing, but from what remains their number and position appears to be as those of *thoracica*; subocular comb rows probably 11 + 12; head seta 10 measurable on one side, although the tip may be missing: 50 μ; seta 11 is missing on one side, the broken remainder on the other shows it to be stouter than 10 and the portion which remains is longer than 10; gular setae 4 + 4. Anterior setae of prothorax missing except for one short spine-like seta on one side;

posterior margin of pronotum with 3 + 3 setae. Central setae of metanotum: 5 + 5; metasternal setae 4 + 3; metapleural setae: 4 + 4. Mesonotum without median division. First tibia missing on both sides; setae of femoral brush: 16 + 16. Microtrichia of genital chamber as in *abidae*. Bursa copulatrix pear-shaped with thickened rim, similar to that shown in Clay, 1966, Pl. I, fig. 4.

Abdominal Chaetotaxy (Text-figs. 40, 41). All the post-spiracular setae, with the exception of one on VIII, are missing. The remaining portion of one of the inner posterior setae on the last tergum suggests that it may be fairly long and stout.

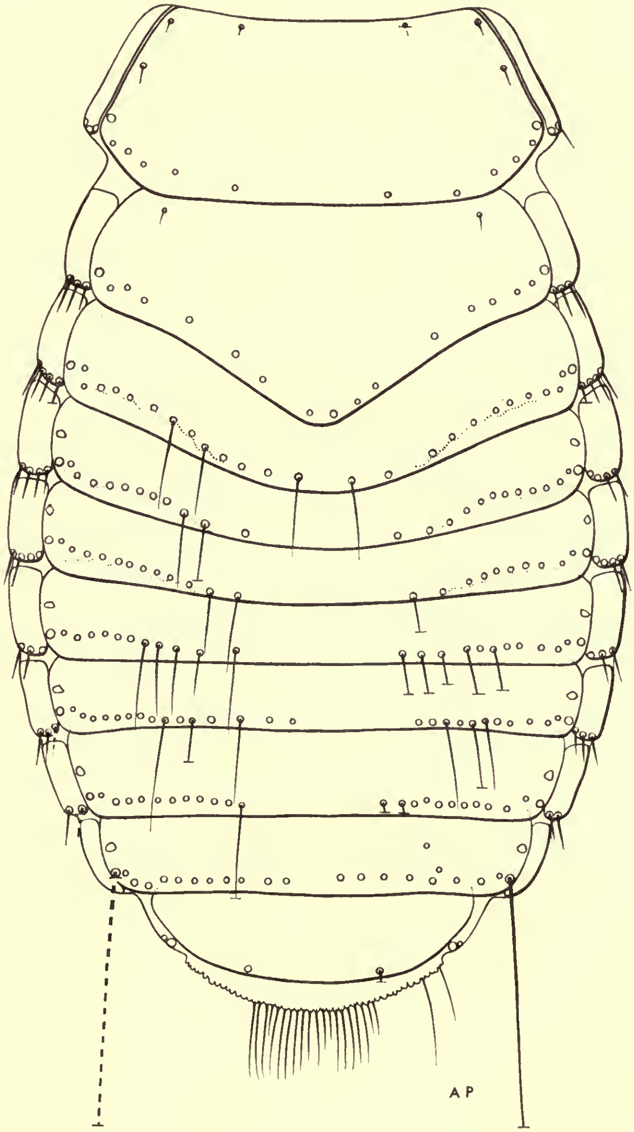


FIG. 40. *Myrsidea imbricata.* ♀ holotype, dorsal.

Discussion. It is probable that the humming bird given on the label was not the true host; no authenticated records of *Myrsidae* are known from the Trochilidae. Without males it is not possible to suggest to what group its true host belongs and the bursa is of the type found in hosts belonging to a number of S. American bird families (see above, p. 236). *M. imbricatum* is probably not the same as any other described species from S. American birds, examples or sufficiently good figures have been seen of all these with the exception of *M. argentina* (Kellogg), which was probably based on a nymph. To find its true host, *imbricatum* will have to be compared with specimens from all the passerine hosts which could have occurred on any of the islands of the Antilles before 1891.

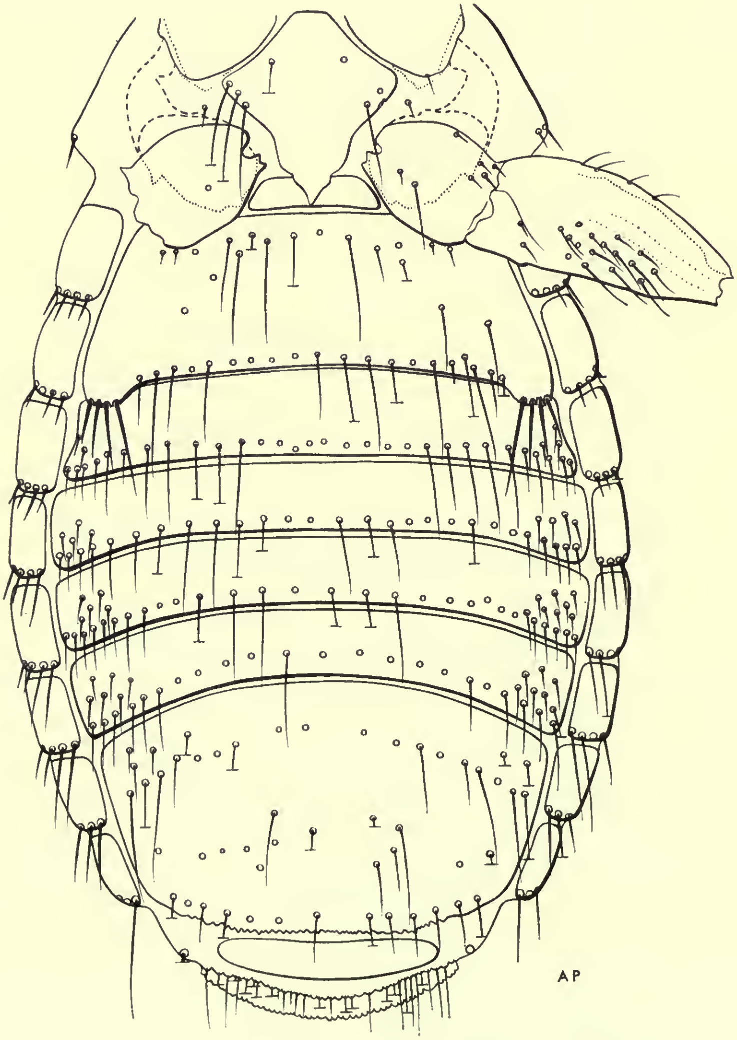


FIG. 41. *Myrsidea imbricata.* ♀ holotype, ventral.

MEASUREMENTS (mm.)

	Length	Breadth
1		0·37
Head	0·33	
2		0·50
Pronotum		0·33
Metanotum		0·51
Total	1·56	

ACKNOWLEDGMENTS

I am greatly indebted to a number of individuals and institutions for loans of type material, these have been acknowledged in the text. I am also grateful to the following for enabling me to see specimens of *Myrsidea* from the Icteridae: Dr. T. H. G. Aitken, Mr. R. S. Balter, the late Mr. M. A. Carriker, Mr. R. C. Dalgleish, Dr. W. D. Downs, Dr. K. C. Emerson, Dr. F. Haverschmidt, Mr. Jerry A. Powell and the United States National Museum. Also to Arthur Smith (AS) and Alan Palmer (AP) for their figures.

I am indebted to Dr. Emmet R. Blake for advising me on the generic arrangement of the Icterid hosts on the lines likely to be used in a later volume of Peter's, Check-List of Birds of the World.

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TABLES I–VIII

Key to species of *Myrsidea* :

A. *diffusa.*
B. *picta.*
C. *magnidens*
D. *mirabilis*
E. *tropicalis.*
F. *downsi.*
G. *laciniata.*
H. *balteri.*
I. *fuscomarginata*
J. *psittaci*
K. *comosa.*

D. based on specimens from Costa Rica, Panama and Honduras. Number of specimens in brackets. R = range; M = mean.

Table I

Tergocentral setae

♀

		B. (5)	D. (3)	E. (4)	F. (4)	H. (7)	I. (4)	J. (4)	K. (4)
I. .	R.	15–18	59–72	48–62	39–53	15–19	11–14	12–17	14–17
	M.	16·4	66·6	54·2	43·5	16·6	12·2	14·2	15·7
II. .	R.	14–17	37–41	32–42	22–31	10–13	11–15	14–17	22–26
	M.	16·1	39	37·5	25·2	11·7	12·3	15·2	24
III. .	R.	17–19	23–32	27–30	18–26	11–13	11–14	16–20	26–29
	M.	18	28·3	28·7	22·2	12·1	12·6	18	27·2
IV. .	R.	17–21	14–20	19–25	17–20	11–14	12–14	20–22	29–31
	M.	19·2	17·3	22	18·2	12·4	13·3	20·7	30
V. .	R.	14–21	14–17	14–22	16–20	10–14	11–14	18–22	25–30
	M.	17·6	15	16·7	18·2	12·3	12·3	20·2	27·7
VI. .	R.	13–18	10–14	12–17	15–18	9–12	6–12	17–18	26–30
	M.	15·8	12	14·7	16·5	10·7	9·6	17·8	28·2
VII. .	R.	13–17	7–9	9–14	14–18	4–6	4–9	14–16	23–29
	M.	14·2	8·3	11	15·5	4·9	5·4(9)	15	24·7
VIII. .	R.	6–8	4	4	6–8	4	4	11–13	17–18
	M.	7·2	4	4	6·7	4	4(8)	11·7	17·3

Table II

Tergocentral setae

♂

		B. (6)	C. (1)	D. (4)	E. (5)	F. (7)	H. (4)	I. (6)	J. (3)	K. (2)
I. .	R.	18–21	21	12–17	16–18	14–21	13–18	10–13	10–13	20–23
	M.	20		15	16·8	17·4	14·8	11·3		
II. .	R.	19–24	24	15–16	14–20	13–17	14–16	11–13	14–15	25
	M.	21·7		15·8	18·2	15·6	15	12·4		
III. .	R.	18–26	28	15–20	15–20	16–19	13–18	11–14	16–17	27–29
	M.	22.8		17·2	17·4	17·1	14·5	12·8		
IV. .	R.	20–25	29	13–16	15–19	14–18	14–16	11–14	17–20	29–33
	M.	23·1		14·7	16·4	16	15·3	12·7		
V. .	R.	20–25	32	13–17	15–17	14–16	13–16	11–13	19–20	30–31
	M.	22·5		15	16	15	13·8	12		
VI. .	R.	21–24	33	11–15	12–16	13–16	12–15	10–13	16–18	28–29
	M.	22·5		14	14·8	14·6	13	11·7		
VII. .	R.	17–20	31	9–14	12–15	11–17	8–10	6–9	15–17	26–27
	M.	19		11·5	13	13·6	9	7·5		
VIII. .	R.	12–17	19	4–9	5–9	7–11	4–6	4	12–15	19–21
	M.	13·5		7	7·8	8·7	5			

Table III

*Marginal setae of sterites**

♀

		B. (6)	D. (3)	E. (7)	F. (4)	H. (3)	I. (1)	J. (4)	K. (4)
II. .	R.	20–24	24–34	26–30	20–28	18–22	19	13–17	14–15
	M.	21·2	26·7	27·6	23·5	19·6		15·5	14·5
III. .	R.	9–12	15–20	16–22	16–20	24–26	25	20–24	24–31
	M.	10·8	17	18	17·7	25		22·2	27·2
IV. .	R.	16–19	20–21	21–23	17–21	19–23	24	23–25	27–30
	M.	17·5	20·3	21·5	19·2	20·6		23·5	28·2
V. .	R.	21–24	19–20	21–28	18–20	19–20	21	21–23	27–29
	M.	22	19·6	24·1	18·7	19·6		22·2	28·8
VI. .	R.	19–22	15–18	20–22	17–18	15–16	16	18–20	22–26
	M.	20·5	17	21·1	17·8	15·6		18·7	24·2
VII. .	R.	13–14	11–14	10–21	14–18	12–14	12	10–14	13–16
	M.	13·8	12·6	15·5	15·5	13		11·5	14·6
VIII–IX. .	R.	11–15	12–21	16–24	15–17	11–12	12	21–23	30–40
	M.	13·8	16	19·2	16·2	11·3		22	34·6
Vu. .	R.	8–16	12–14	12–19	13–15	11–14	10	9–11	18–21
	M.	12	12·6	14·8	14·2	12·3		10·2	19·2

* Includes marginal setae of brushes. Vu. marginal setae of vulva.

Table IV

Marginal setae of sternites

♂

		B. (6)	D. (5)	E. (4)	F. (7)	H. (3)	I. (1)	J. (3)	K. (2)
II. .	R.	7–12	12–18	17–24	9–13	16–18	17	12–15	14–15
	M.	8·8	15·4	20·7	10·9	17·3		13·7	14·5
III. .	R.	18–22	17–22	22–26	15–22	22	24	19–23	24–27
	M.	20·8	20	23·2	20·1			20·7	25·5
IV. .	R.	20–27	22–23	24–26	20–24	21–22	23	22–23	23–26
	M.	22·5	22·7	24·7	22·1	21·3		22·7	24·5
V. .	R.	20–23	21–24	25–26	21–23	20–22	22	20–23	27
	M.	22·3	22·6	25·2	22	21		21·3	
VI. .	R.	20–22	21–23	22–25	21–23	16–19	19	19–20	25
	M.	21·2	22·2	23·7	21·7	18		19·5	
VII. .	R.	14–18	16–19	18–20	16–20	14–16	13	14–15	18
	M.	16·8	17·2	19·2	18	14·7		14·5	
VIII. .	R.	6–8	11–15	11–13	8–12	6	4	7	11
	M.	6·3	14·8	11·5	9·7				
IX. .	R.	8–11	9–13	13–16	10–12	10–14	5	5–6	17
	M.	9·2	11·4	14·2	10·9	12		5·7	

TABLE V

♀

		B. (12)	D. (6)	E. (7)	F. (8)	H. (6)	I. (1)	J. (8)	K. (4)
		Anterior sternal setae							
II. .	R.	7–10	13–25	30–41	9–11	9–11	8	10–16	24–28
	M.	8·4	19	34·7	10	10		13·7	25·7
		*Lateral anterior sternal setae**							†
III. .	R.	0–1	4–5	3–7	0–1	2–4	2 + 3	2–5	27–34
	M.	0·19	4·3	5	0·12	3·3		2·9	29
IV. .	R.	3–6	3–5	4–8	2–5	6–7	5 + 6	5–9	35–40
	M.	4·9	3·8	5·6	3·2	6·8		7·4	36·8
V. .	R.	2–6	3–4	4–8	2–5	5–6	6 + 6	8–11	37–46
	M.	4·2	3·6	6·2	3·6	5·3		8·7	41·6
VI. .	R.	1–5	2–5	4–8	2–5	2–4	2 + 4	4–8	37–39
	M.	3·2	3·3	6	3·4	3·5		6·6	38
VII. .	R.	1–2	1–4	2–5	1–4	0–1	1 + 1	5–7	33–35
	M.	1·7	3	3·1	2·5	0·5		5·5	34

* Lateral brushes not including marginal setae. † Number includes all anterior setae, lateral and median. Each side counted separately except for K.

TABLE VI

♂

		B. (12)	D. (5)	E. (4)	F. (7)	H. (6)	I. (1)	J. (6)	K. (1)
		Anterior sternal setae							
II. .	R.	7–12	12–18	17–24	9–13	7–9	7	11–12	28
	M.	8·8	15·4	20·7	10·9	8		11·3	
		*Lateral anterior sternal setae**							
			†	†	†				†
III. .	R.	0–4	9–23	13–22	6–11	2–4	4 + 2	0–2	22
	M.	1·4	16	19	8·7	3·2		0·83	
IV. .	R.	2–6	10–19	18–23	5–9	4–7	3 + 5	4–7	27–32(2)
	M.	4	14	19·5	7	5		5·7	
V. .	R.	2–6	9–16	16–20	7–12	2–5	5 + 5	6–8	35
	M.	4·1	13·2	18·2	8·8	4·2		6·7	
VI. .	R.	2–6	12–17	18–22	8–11	3–4	4 + 3	5–8	38
	M.	3·1	13·4	19·7	9·1	3·3		6·4	
VII. .	R.	2–4	8–14	14–15	6–12	1–2	1 + 1	4–5	34
	M.	3·1	11	14·7	10·3	1·2		4·2	

* † As for Table V.

TABLE VII

Measurements in mm.

♀

Length	A.	B.	C.	D.	E.	F.	G.	H.	I.	J.	K.
Head . .	0·34	0·33	0·32	0·33	0·35	0·35	0·33	0·36	0·34	0·32	0·33
Total . .	1·67	1·74	1·55	1·70	1·98	1·93	1·81	1·75	1·80	1·59	1·90
Breadth											
Head 1 . .	0·36	0·36	0·38	0·36	0·39	0·39	0·36	0·37	0·36	0·37	0·39
Head 2 . .	0·51	0·52	0·52	0·54	0·57	0·55	0·54	0·50	0·52	0·53	0·55
Prothorax .	0·34	0·36	0·34	0·37	0·40	0·37	0·36	0·36	0·35	0·35	0·39
Metanotum .	0·47	0·53		0·55	0·58	0·57	0·55	0·52		0·48	0·54

♂

Length	A.	B.	C.	D.	E.	F.	G.	H.	I.	J.	K.
Head . .	0·31	0·31	0·32	0·32	0·32	0·32	0·31	0·34	0·32	0·30	0·31
Total . .	1·42	1·53	1·29	1·45	1·57	1·50	1·49	1·39	1·41	1·35	1·68
Breadth											
Head 1 . .	0·33	0·34	0·33	0·34	0·36	0·36	0·34	0·34	0·32	0·34	0·37
Head 2 . .	0·46	0·49	0·46	0·49	0·51	0·49	0·49	0·50	0·46	0·48	0·51
Prothorax .	0·30	0·32	0·32	0·32	0·34	0·32	0·33	0·32	0·30	0·31	0·36
Metanotum .	0·37	0·40		0·39	0·47	0·42	0·40	0·43		0·38	0·40

TABLE VIII

Range (R) and mean (M) of head breadth in mm.

♀

	B. (10)	D. (10)	E. (10)	F. (4)	G. (7)	H. (8)	J. (5)	K. (4)
R.	0·52–0·55	0·51–0·55	0·54–0·58	0·55–0·58	0·51–0·56	0·54–0·56	0·52–0·54	0·51–0·55
M.	0·54	0·53	0·56	0·56	0·54	0·55	0·53	0·54

♂

	B. (10)	D. (10)	E. (10)	F. (4)	G. (7)	H. (8)	J. (5)	K. (4)
R.	0·48–0·50	0·46–0·49	0·48–0·51	0·49–0·52	0·48–0·50	0·50–0·51	0·48–0·49	0·50–0·51
M.	0·490	0·470	0·500	0·500	0·490	0·503	0·483	0·507

BRITISH MUSEUM 22 FEB 1968 NATURAL HISTORY

PLATE 1

Fig. 1. *Myrsidea isostoma* (Nitzsch). ♂ internal genitalia. s, spermatophore. (TC).

Fig. 2. *Myrsidea aitkeni* Clay. Spermatophore in extruded genital sac. g. genital sclerite. (TC).

Fig. 3. *Myrsidea aquilonia*. Spermatophore in abdomen. (TC).

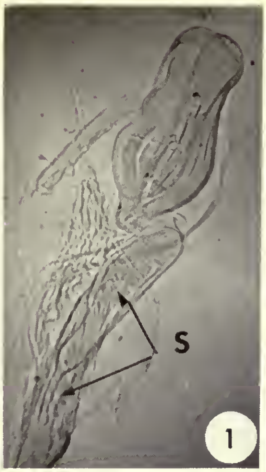
Fig. 4. *Myrsidea tropicalis*. Bursa copulatrix. (TC)

Fig. 5. *Myrsidea bonariensis*. Bursa (TC)

Fig. 6. *Myrsidea picta*. Dorsal pair of setae on last segment of maxillary palp. (TC).

Fig. 7. *Myrsidea fuscomarginata* (from *Agelaius phoeniceus*). As fig. 6.

Fig. 8. *Myrsidea fuscomarginata* (from *Agelaius phoeniceus*). Tip of longest seta in aster on sternite II, ♀. (Stereoscan, H. E. Hinton).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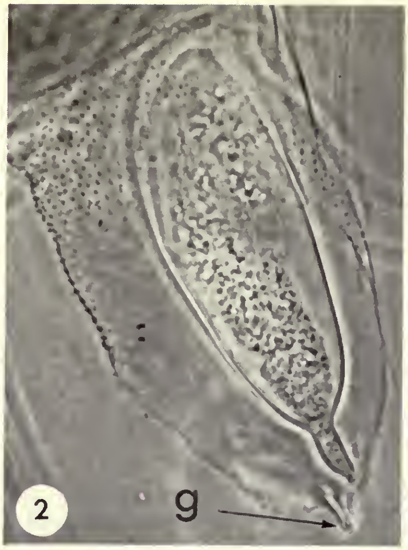
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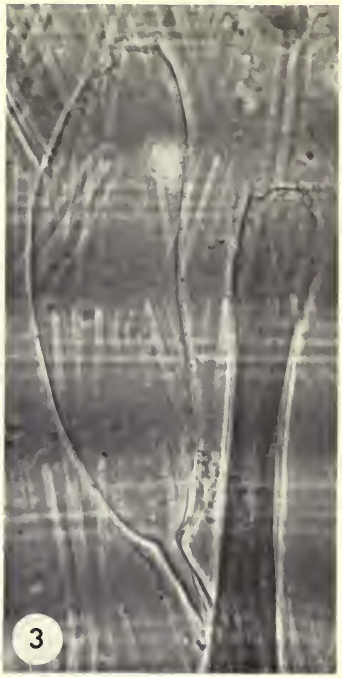
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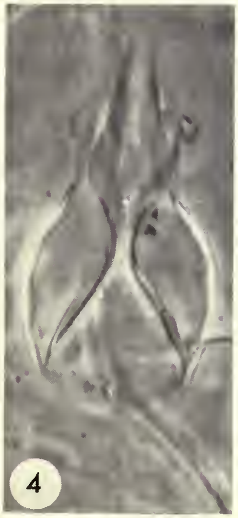
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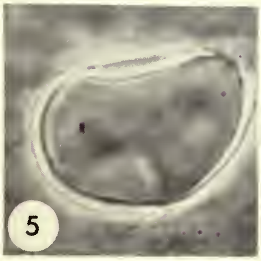
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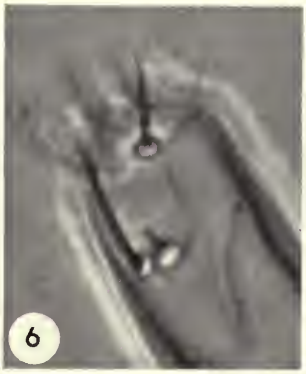
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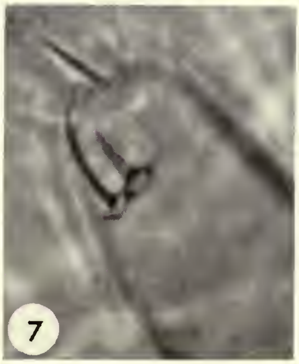
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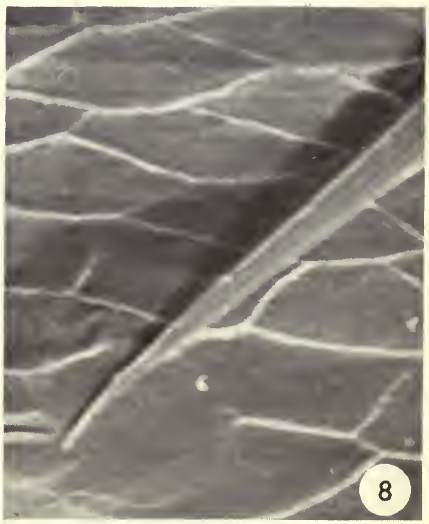
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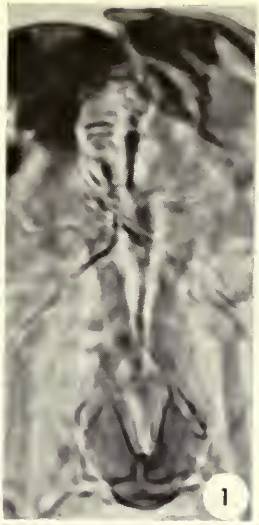
PLATE 2

FIG. 1. *Myrsidea fuscomarginata* (from *Agelaius phoeniceus*). Hypopharynx. (TC).
FIG. 2. *Myrsidea aquilonia*. Hypopharynx. (TC).
FIG. 3. *Myrsidea psittaci*. Hypopharynx. (TC).
FIG. 4. *Myrsidea aquilonia*. ♂ head. (TC).
FIG. 5. *Myrsidea fuscomarginata* (from *Agelaius phoeniceus*). Distal part of ♂ genitalia. a. inwardly projecting arm of basal plate.
FIG. 6. *Myrsidea psittaci* (from *Agelaius icterocephalus*). As fig. 5.
FIG. 7. *Myrsidea comosa*. As fig. 5.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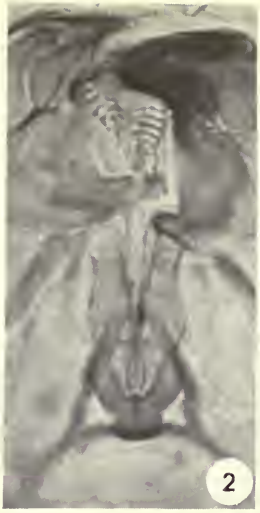
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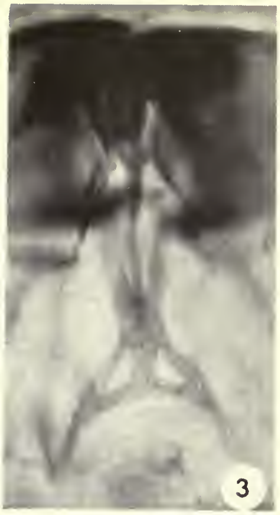
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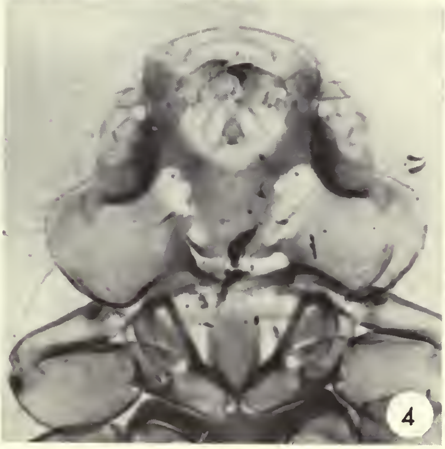
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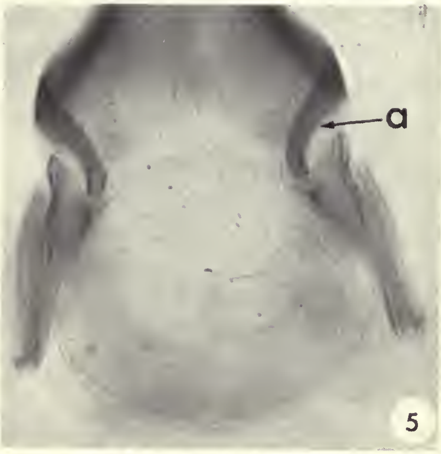
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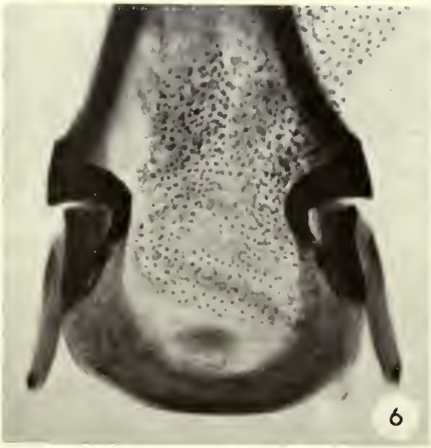
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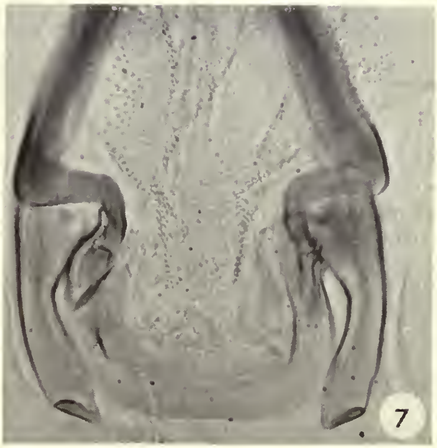
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PLATE 3

Fig. 1. *Myrsidea magnidens.* ♂ head, holotype. (TC).

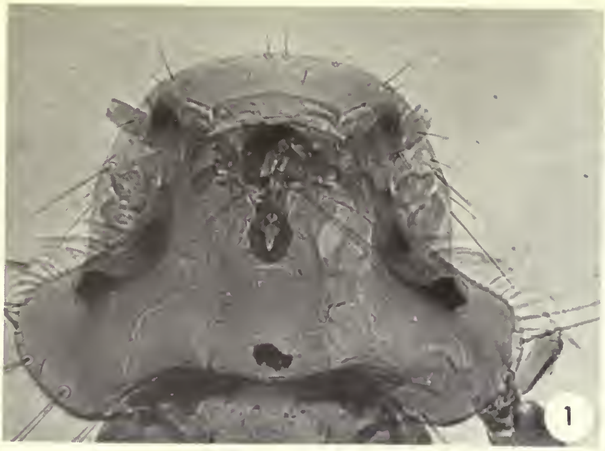
Fig. 2. *Myrsidea bonariensis.* ♀ head, holotype.

Fig. 3. *Myrsidea imbricata.* ♀ head, holotype. Arrow points to position of head seta 11. (TC).

Fig. 4. *Myrsidea downsi.* ♂ abdomen, dorsal. (TC).

Fig. 5. *Myrsidea comosa.* ♂ abdomen, dorsal. (TC).

Fig. 6. *Myrsidea comosa.* ♀ abdomen, ventral. (TC).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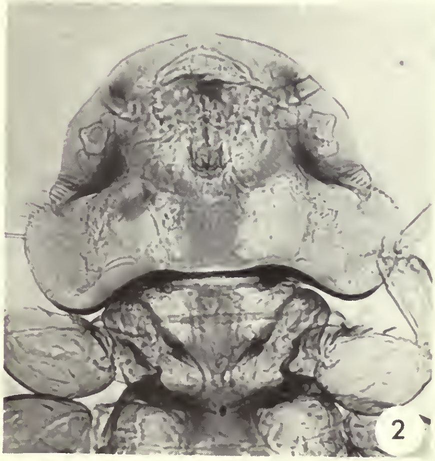
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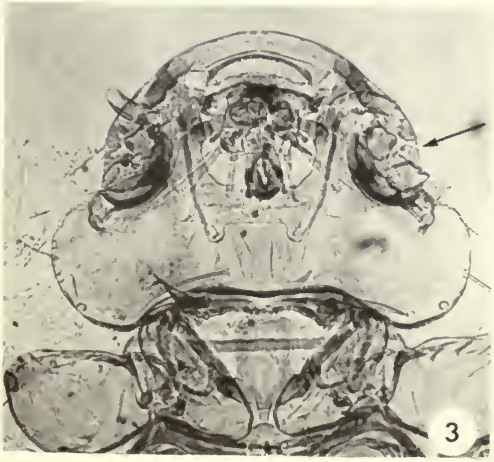
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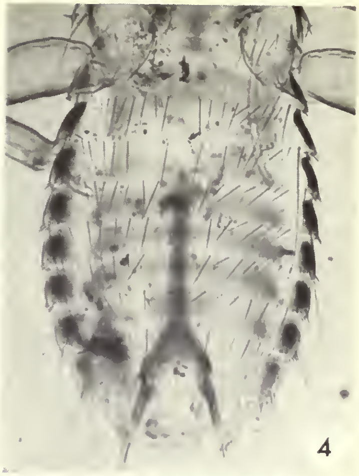
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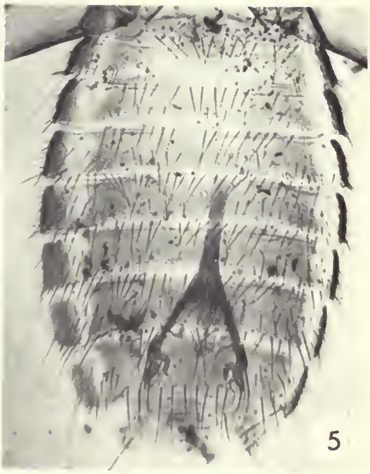
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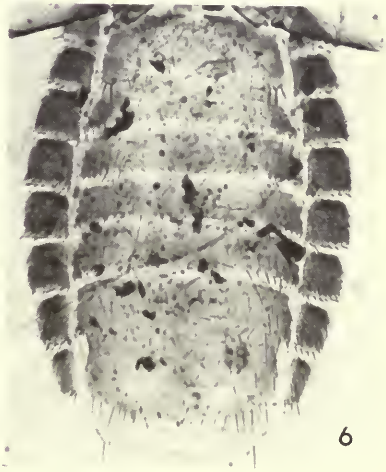
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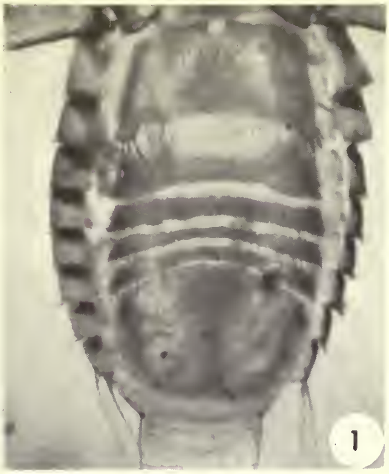
PLATE 4

Myrsidea spp. ♀ abdominal sterna.

FIG. 1. *M. picta.* (TC).
FIG. 2. *M. mirabilis.* (TC).
FIG. 3. *M. tropicalis.* (TC).
FIG. 4. *M. laciniata.* s, indentation at posterior margin of sternum VII. (TC).
FIG. 5. *M. balteri.* (TC).
FIG. 6. *M. psittaci* (from *Scaphidura oryzivora*). (TC).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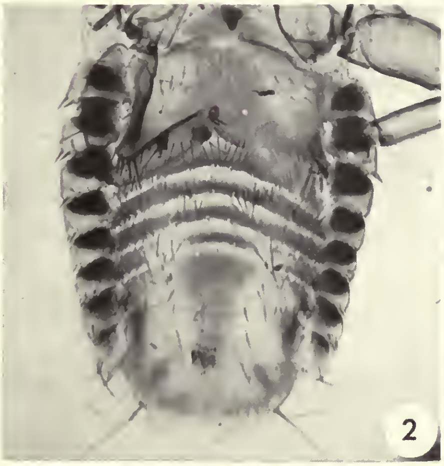
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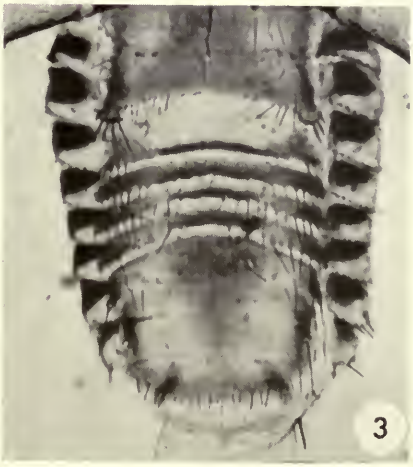
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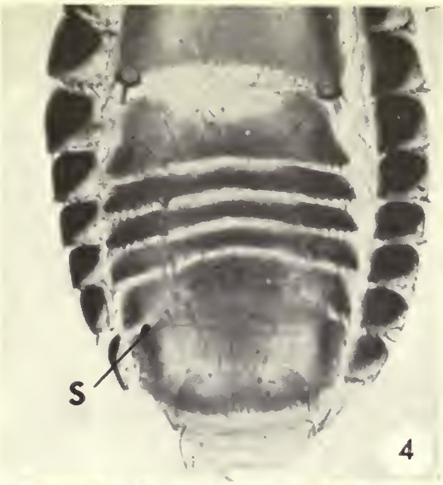

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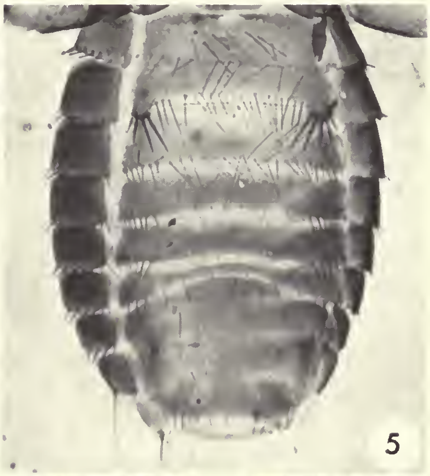
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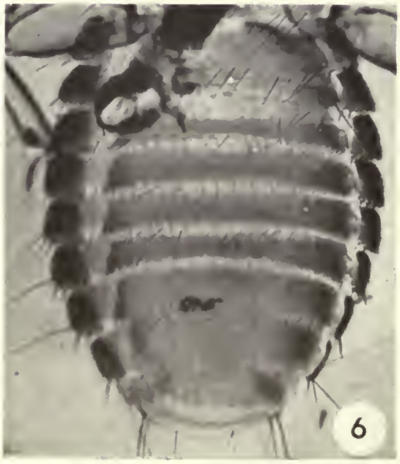
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2. Nixon, G. E. J. A reclassification of the tribe Microgasterini (Hymenoptera : Braconidae). Pp. 284 ; 348 Text-figures. August, 1965. £6.
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J. DE BEAUMONT

BULLETIN OF
THE BRITISH MUSEUM (NATURAL HISTORY)
ENTOMOLOGY Vol. 21 No. 5
LONDON: 1968

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PAR

J. DE BEAUMONT
Musée Zoologique, Lausanne

Pp. 245–278 ; 17 *Text-figs.*

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SPHECIDAE (HYM.) DES ÎLES CANARIES

Par Jacques de Beaumont

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SOMMAIRE

Ce travail donne un tableau complet de nos connaissances actuelles sur les Sphecidae des îles Canaries ; il est basé principalement sur le matériel récolté par M. K. M. Guichard ; 6 espèces et 3 sous-espèces nouvelles sont décrites.

SYNOPSIS

This work gives a general account of our actual knowledge of the Sphecidae of the Canary islands ; it is based chiefly upon the material collected by Mr K. M. Guichard ; 6 species and 3 subspecies are described.

CANARY ISLAND LOCALITIES

All the best localities for sphecids in the Canaries are sandy and close to the sea. The only species at all common above say 100 metres are *Ammophila tydei, A. terminata, Cerceris concinna* and *Tachysphex simonyi*, while *Diodontus freyi, Ectemnius continuus, Oxybelus fischeri* and *Miscophus* are distinctly rare. Nearly all the others seem confined to sea level and the great majority have been taken either at Maspalomas (20 species), Puerto Del Rosario (18 species) or Los Cristianos (12 species).

Maspalomas is a unique locality in the western Canaries and the only one where sand dunes exist and they stretch unbroken along the coast for about 2 miles. The insect fauna of these dunes is a special one and seems to have affinities with that of the nearest parts of North Africa. For example, 3 species of typically African grasshoppers are found in these dunes and apparently nowhere else in the islands. Unfortunately Maspalomas is being turned into a popular seaside resort and some unique natural habitats are disappearing. The acre of ground where I first collected *Psen sublaevis* in 1964 is now occupied by a sanatorium. However, the total area is fairly large and some of the dunes may always prove an obstacle to the builder and the litter-throwing herds from Las Palmas.

It is in the dune depressions that many of the sphecids are found, especially on the ground along the sunny edges of the Tamarisk bushes, where *Miscophus* flies up and down over the fallen leaf debris and it requires great concentration to obtain a small series. In June a low growing *Ononis*, infested with homopterous larvae and which grows on the firmer sand, proves attractive to a number of small sphecids including *Eremiasphecium*. But the best time for collecting by the sea is the end of April and the first half of May, after which the natural vegetation dries up rapidly and the sphecids soon disappear. By the coast in July and August there is very little on the wing although *Miscophus* can be found and also *Bembix.* In 1964 I was not in the eastern Canaries later than 24th May and possibly *Bembix* and even a *Sphex* may occur in Fuerteventura later in the year. A few sphecids, the crabronids and *Passaloecus* must be sought on and about vegetation growing in the cooler and damper parts of the islands. I should be surprised if, in the Canaries, more than a dozen species of sphecids await discovery.

K. M. GUICHARD

INTRODUCTION

L'étude des faunes insulaires a toujours séduit les zoologistes et les biogéographes par la multitude des problèmes qu'elle pose. Comment les îles ont-elles été peuplées ? Comment évoluent les espèces qui s'y trouvent isolées ? Telles sont les principales questions auxquelles on tente de répondre à l'aide de données géologiques souvent très insuffisantes et en se basant sur la comparaison de la faune actuelle des îles avec celles des régions avoisinantes.

Les Canaries et les îles Atlantides en général ont déjà donné lieu à bien des travaux, que l'on trouvera en bonne partie résumés dans un Mémoire de la Société de Biogéographie (1946) et le Compte-rendu d'un Colloque du C.N.R.S. (1961).

Grâce à l'inlassable et féconde activité de collectionneur de M. K. M. Guichard, je puis maintenant apporter une contribution à la connaissance des Hyménoptères de ces îles Fortunées, comme les appelaient les Romains. J'ai pensé faire oeuvre utile en joignant à l'étude du matériel si aimablement mis à ma disposition tous les renseignements que nous possédons actuellement sur les Sphécides de cet archipel. Ainsi se trouve réalisée une étape dans nos connaissances.

Mes remerciements vont naturellement en premier lieu à M. Guichard, qui a récolté et m'a soumis à l'étude le produit de ses récoltes ; j'exprime aussi ma reconnaissance à tous ceux qui m'ont prêté du matériel ou fourni des renseignements ; ce sont les entomologistes des musées de Genève, Helsinki, Londres, Paris, Stockholm, et Vienne, sans oublier mes collègues et amis P. M. F. Verhoeff et W. J. Pulawski.

HISTORIQUE

Quelques travaux seulement ont été consacrés, en tout ou en partie, aux Hyménoptères des îles Canaries ; on peut citer Brullé (1840), Pérez (1895), Saunders (1903, 1904), Bischoff (1937), de Beaumont (1954*a*). Diverses espèces nouvelles sont décrites dans ces contributions ; les unes se sont révélées valables et endémiques, d'autres valables mais assez répandues, d'autres enfin sont tombées en synonymie. Dans plusieurs autres oeuvres entomologiques, on trouve la description d'espèces nouvelles provenant des Canaries ou la mention que certaines espèces ont été trouvées dans ces îles.

En additionnant ces données éparses, on arrive à un total de 29 espèces de Sphecides pour l'ensemble de l'archipel ; deux d'entre elles sont douteuses et certaines ont été citées comme " sp. ".

Récoltes de M. Guichard

M. K. M. Guichard a fait deux expéditions entomologiques aux Canaries, en 1964 et 1966 et les Sphecidae qu'il a récoltés sont au nombre de 1050 environ. Le grand intérêt de cette collection, c'est qu'elle a été faite dans toutes les îles de l'archipel et, comme on le verra par la suite, la faune est assez variable d'une île à l'autre. Grâce à sa compétence de collectionneur, M. Guichard a retrouvé la plupart des espèces qui avaient été signalées avant lui et il a pu allonger la liste de plus de 20 unités ; il s'agit souvent d'espèces de petite taille, négligées par les entomologistes moins avertis. Ces récoltes m'ont permis de décrire 6 espèces et 3 sous-espèces nouvelles.

Liste des localités de récolte de M. Guichard

Lanzarote : Arrecife (S.L.), 18.v.64 ; Haria, 18–19.v.64 ; Penas del Chache, 19.v.64 ; Tahiche (*c.* 50 m.), 23–24.v.64.

Fuerteventura : Above Ampuyenta (*c.* 500 m.), 29.iv.64 ; Betancuria (350 m.), 2–3.v.64 ; Corralejos, 9–10.v.64 ; Cotillo, 7.v.64 ; Gran Tarajal (S.L.), 12–13.v.64 ; Puerto del Rosario (S.L.), 27.iv–12.v.64 ; Valle Canarios (100 m.), 15.v.64.

Gran Canaria : Cruz de Tejeda (1450 m.), 22–23.vi.66 ; El Palmital (400 m.), 24.vi.66 ; Firgas (500 m.), 22.vi.64 ; La Isleta (50 m.), 18–21.vi.64 ; Maspalomas, 17–23.vi.64, 17–28.vi.66, 16.viii.66.

Tenerife : Adeje (100 m.), 13.iv.64 ; Aguamansa (*c.* 1000 m.), 5.vi.64 ; Bn. del Infierno (350 m.), 19.vii.66 ; Las Cañadas (2100 m.), 30–31.v.64 ; La Esperanza (*c.* 350 m.), 26.v.64, (1400 m.), 1.vii.66 ; Las Mercedes (500 m.), 14.vi.64, 22.vii.66, (300 m.), 1.vii.66 ; La Vega (1000 m.), 13.vii.66 ; Los Cristianos (S.L.–50 m.), 9–17.iv.64, 19.vii.66 ; Parador de Teide (2200 m.), 15.vii.66 ; Pico de los Flores (*c.* 1000 m.), 5.vi.64 ; P. Orotava (= Puerto de la Cruz) (S.L.), 6–11.vii.66 ; Puerto de la Cruz, 29.v.64 ; San Andres (*c.* 50 m.), 9–15.iv.64 ; Above San Andrés (250 m.), 25.iv.64.

Gomera : Above Agulo (300 m.), 7.viii.66 ; Chipude (1200 m.), 4.viii.66 ; Chipude forest (1200 m.), 4.viii.66 ; Playa Calera (S.L.), 4.viii.66.

Hierro : Frontera (100 m.), 28–29.vii.66, 1.viii.66 ; Above Frontera (1100 m.), 28–31.vii.66 ; below Sabinosa (S.L.), 30.vii.66 ; Valverde (500 m.), 26.vii.66.

Palma : Los Tilos (250 m.), 23.vii.66, (*c.* 600 m.), 8.vi.64.

Dans la liste des espèces, les altitudes et les dates ne sont pas répetées.

Autre matériel examiné

En 1956, j'ai reçu un certain nombre de Sphécides récoltés à Ténérife par M. J. M. Fernandez ; les espèces étant les mêmes que celles récoltées par M. Guichard, je n'en ferai pas mention ; par contre, M. Fernandez avait aussi envoyé des insectes à M. P. M. F. Verhoeff et parmi ceux-ci se trouve le *Dasyproctus* décrit ci-dessous comme nouveau. En 1966, le Musée de Stockholm m'a soumis des Sphecidae récoltés en 1957 et en 1960 à Tenerife et Gran Canaria par M. Lundblad, mais là aussi il n'y avait que des espèces figurant dans la collection de M. Guichard. Enfin, j'ai reçu de divers côtés quelques spécimens isolés, en particulier le ♂ de *Tachysphex filicornis* Kohl signalé ci-dessous.

Etablissement de la liste des espèces

Pour chaque espèce, j'ai indiqué tout d'abord les données de la littérature, puis les spécimens récoltés par M. Guichard dans le même ordre que la liste des localités de capture ; le nombre de ♂ et de ♀ est totalisé pour chaque île ; des indications complètes sont données sur les types.

Problèmes taxonomiques en suspens

Faute de matériel suffisant dans des groupes difficiles, je n'ai pas pu résoudre certains problèmes systématiques. Je n'ai pas craint, une fois de plus, d'utiliser la méthode que l'on pourrait nommer la Taxonomie provisoire ou la Taxonomie d'attente, au sujet de laquelle j'ai fait quelques remarques dans un récent travail sur les Sphécides de Turquie. On trouvera donc encore dans ce travail un certain nombre de " sp. " !

PROBLÈMES ZOOGÉOGRAPHIQUES ET TAXONOMIQUES

Pauvreté de la faune

Une première constatation que l'on peut faire, c'est le petit nombre d'espèces récoltées. C'est ainsi qu'il n'y a pas un *Sphex*, pas un *Tachytes*, un seul *Bembix*, un seul *Gorytes*, un seul (peut être deux) *Cerceris*, 4 *Ammophila*, alors qu'au Maroc on rencontre d'assez nombreuses espèces appartenant à ces genres. La comparaison devient moins défavorable pour certains genres, dont les représentants sont de petite taille, les *Miscophus* en particulier. Il est probable que de nouvelles récoltes pourront augmenter l'effectif actuellement connu, mais cela ne sera probablement pas dans de grandes proportions.

Comme le dit Vandel (C.N.R.S. 1961 : 293) : " Il y a des lacunes étonnantes dans la faune des îles. On se demande pourquoi certains genres que tout semble prédisposer à y vivre n'y sont pas représentés. Evidemment, il est beaucoup plus facile d'expliquer pourquoi une forme se trouve dans une île, et d'ailleurs on trouve toujours une explication ; mais il est beaucoup plus difficile d'expliquer pourquoi des formes ne s'y trouvent pas. " Vandel suppose alors que, dans certaines îles, la faune a pu subir de grandes destructions à la suite de phénomènes volcaniques par exemple ; sur des îles très isolées, ces pertes sont irrémédiables. Dans certains cas, ces disparitions sont compensées par un foisonnement des formes qui ont survécu aux cataclysmes ; ce n'est pas ce que l'on voit chez les Sphécides des Canaries.

Il ne faut pas oublier non plus qu'il serait plus normal de comparer la faune de l'archipel, non pas à celle de l'Afrique du N.-O. entière, mais à celle d'une surface comparable du territoire marocain. Lors de son isolement, l'archipel n'a pas joué le rôle d'une arche de Noë où se seraient rassemblée la faune d'une vaste région, mais il ne s'y est trouvé que la faune plus restreinte d'une zone plus limitée.

Répartition générale des espèces canariennes

En laissant de côté les espèces dont la présence est douteuse et celles qui n'ont pu être déterminées avec certitude, on peut établir les groupes suivants :

1. Espèces largement répandues dans le bassin méditerranéen, certaines remontant jusqu'en Europe centrale : *Ammophila tydei*, *affinis*, *terminata*, *Sceliphron spirifex*,

Bembix flavescens, Liris atrata, Tachysphex panzeri, costai, nitidus, filicornis, Miscophus eatoni, Trypoxylon attenuatum, Ectemnius continuus, Oxybelus mucronatus.

2. Espèces se rencontrant, outre les Canaries, dans toute l'Afrique du N.-O., ou même jusqu'en Egypte et en Israël : *Ammophila mauritanica, Pseudoscolia dewitzi, Astata bifasciata, Liris haemorrhoidalis, nigricans, agilis, Miscophus deserti, pseudomimeticus, Diodontus oraniensis, Lindenius hamilcar, Oxybelus fischeri.*

3. Une espèce dont la répartition, en Afrique du nord, est limitée à la zone côtière du Maroc (Répartition du type macaronésien) : *Oxybelus cocacolai.*

4. Espèces dont la reparition connue est disjointe : *Psen sublaevis* n'est connu, outre les Canaries, que du Fezzan et du Tibesti, *Eremiasphecium schmiedeknechti, Solierella dispar* et *pectinata* que d'Egypte et *Miscophus albomaculatus* que d'Israël. Il est fort possible que des stations intermédiaires existent pour ces espèces, de petite taille, et pouvant facilement passer inaperçues.

5. Espèces qui n'ont été trouvées jusqu'à présent qu'aux Canaries : *Cerceris concinna, Gorytes guichardi, Astata sepulchralis, Tachysphex simonyi, Miscophus primogeniti, canariensis, nitidior, guichardi, Solierella canariensis, Diodontus freyi, Spilomena canariensis, Crossocerus lindbergi, Dasyproctus fortunatus.* Ces espèces endémiques, représentant le 30% de l'effectif, ont généralement des parents assez proches dans le nord de l'Afrique. L'élément le plus isolé est le *Dasyproctus.*

Le groupement que je viens d'établir pourra subir quelques modifications à la suite de nouvelles découvertes et de l'identification des espèces restées douteuses. Mais ces compléments ne changeront pas les conclusions que l'on peut déjà tirer et que l'on peut exprimer de la manière suivante : la faune des Sphécides canariens n'a de rapports avec celle de l'Europe méridionale que par l'intermédiaire d'espèces largement répandues dans le bassin méditerranéen ; elle est très proche de la faune de l'Afrique du nord et plusieurs de ses éléments sont plus ou moins nettement sahariens ; elle compte un nombre assez élevé d'endémismes représentés par des espèces généralement voisines de celles du nord de l'Afrique.

Ce sont là des conclusions qui concordent avec celles qui ont été tirées de l'étude d'autres groupes d'animaux (Société de biogéographie, 1946).

Répartition dans les diverses iles

Il est nécessaire de pousser cette analyse plus loin et d'étudier la répartition des espèces au sein même de l'archipel. D'emblée, on doit tenir compte du fait que certaines îles ont été beaucoup moins explorées que d'autres ; ainsi, nos connaissances sur la faune de Gomera, Hierro et Palma sont rudimentaires ; Lanzarote est un peu mieux connu ; les seules îles sur lesquelles la documentation est plus complète sont Fuerteventura, Gran Canaria et Tenerife, puisque, en plus de M. Guichard, plusieurs autres entomologistes y ont récolté. Ceci dit, nous pouvons de nouveau répartir les espèces en groupes, différant en partie de ceux du paragraphe précédent. Les 2 premiers de ces groupes sont formés d'espèces dont la répartition au sein de l'archipel nous apparait normale ou logique ; pour les 3 derniers, des problèmes se posent.

1. Espèces répandues dans le bassin méditerranéen ou en Afrique du nord, répandues aussi aux Canaries dans les 3 îles bien explorées, ou tout au moins à

Fuerteventura et dans l'une des 2 autres ; *Ammophila tydei, terminata, Astata bifasciata, Liris atrata, Miscophus pseudomimeticus, Diodontus oraniensis, Oxybelus fischeri.*

2. Espèces plus ou moins répandues en Afrique du nord, trouvées aux Canaries dans les îles orientales, Fuerteventura et Lanzarote : *Ammophila mauritanica, affinis, Pseudoscolia dewitzi, Tachysphex nitidus, Miscophus deserti, Lindenius hamilcar, Oxybelus mucronatus, cocacolai.* Si l'on admet que les îles proches du continent s'en sont détachées plus tardivement, ce type de répartition ne pose pas de grands problèmes.

3. Certaines espèces, plus ou moins répandues en Afrique du nord, n'ont été trouvées dans l'archipel qu'à Tenerife et Gran Canaria ou dans l'une ou l'autre de ces îles : *Sceliphron spirifex, Bembix flavescens, Liris haemorrhoidalis, nigricans, agilis, Tachysphex panzeri, costai, filicornis, Miscophus eatoni, Trypoxylon attenuatum, Ectemnius continuus.* Il est naturellement possible que ces espèces existent à Fuerteventura ou Lanzarote et qu'elles n'y ont pas été capturées. Si elles manquent réellement, c'est soit qu'elles n'y ont jamais habité, soit qu'elles ont disparu. Je m'abstiendrai du petit jeu des hypothèses que l'on pourrait faire à cet égard.

4. Les espèces à répartition disjointe, formant le groupe 4 du paragraphe précédent, ont été trouvées les unes (*Miscophus albomaculatus, Solierella dispar*) dans les îles proches du continent, les autres (*Eremiasphecium schmiedeknechti, Solierella pectinata, Psen sublaevis*) à Gran Canaria, ce qui nous ramène au cas précédent.

5. Les espèces endémiques ont des répartitions très diverses, ce qui pourrait aussi nous conduire dans le domaine de l'hypothèse.

Les problèmes de la variation géographique des formes insulaires

Il ne faut pas nous leurrer : dans l'attribution du rang taxonomique de certaines formes insulaires (simple race ne méritant même pas ce nom, sous-espèce mieux caractérisée, espèce distincte), les facteurs subjectifs jouent un grand rôle. Ces formes isolées géographiquement ont pu en effet acquérir tous les degrés de l'isolement reproductif et génétique sans que nous puissions le déterminer sur du matériel de collection. Nous ne pouvons donc nous baser que sur les caractères morphologiques et chromatiques, et ceux-ci ne sont pas la mesure exacte des différences génétiques. En tenant compte de ces restrictions, l'on peut cependant faire quelques constatations intéressantes.

Dans certains cas, l'on ne trouve pratiquement pas de différences ou des différences minimes entre les races canariennes et les races continentales d'une espèce donnée. Ce fait est particulièrement frappant lorsqu'il s'agit d'espèces dont l'aire est disjointe, ou qui, tout au moins, sont formées de populations très isolées, depuis longtemps, dans la région saharienne. Je constate par exemple que les *Psen sublaevis* de Gran Canaria sont semblables à ceux du Tibesti ou que les *Eremiasphecium schmiedeknechti* de la même île ne diffèrent pratiquement pas de ceux de l'Egypte ; il en est de même pour certains *Miscophus* et *Solierella.*

Dans d'autres cas, la race canarienne est bien différente de celle du continent et une distinction au moins subspécifique s'impose ; c'est ce que l'on remarque chez

Tachysphex panzeri et *costai*, *Ectemnius continuus*, espèces qui ne sont connues que d'une île ou de 2 îles proches.

Certaines espèces enfin, répandues dans l'archipel, présentent une variation insulaire très marquée. C'est ce que l'on note en particulier chez *Bembix flavescens* et *Miscophus canariensis* ; l'examen des caractères chromatiques d'un individu permettrait, même sans étiquette de provenance, de dire de quelle île il est originaire ; à un plus faible degré, le phénomène s'observe chez *Cerceris concinna*. Un type de variation très intéressant est celui que l'on observe chez *Ammophila terminata* et *Oxybelus fischeri*. Chez la 1ère de ces espèces, les individus de Lanzarote, Fuerteventura et Gran Canaria sont semblables à ceux du continent, ceux du Tenerife par contre différents ; chez la 2ème, les spécimens de Fuerteventura sont semblables à ceux du continent, ceux de Gran Canaria et Tenerife formant une sous-espèce distincte. Le cas des *Tachysphex nitidus* et *simonyi* est assez semblable.

Telles sont quelques observations que j'ai faites, qui semblent montrer que certaines espèces ne varient plus guère, tandis que d'autres ont conservé un grand pouvoir de diversification.

Le peuplement des Canaries

Pendant longtemps, les géologues et biogéographes étaient divisés en deux clans : ceux qui admettaient une origine volcanique de l'archipel canarien, qui n'aurait jamais eu de contact avec le continent et ceux pour qui ces îles représentent les vestiges de terres qui prolongeaient vers l'ouest le continent, séparées à la suite d'effondrements. La première de ces hypothèses n'a plus beaucoup d'adhérents et nous devons donc admettre que la faune des îles doit s'expliquer en tenant compte des contacts qu'elles ont eu, à des époques plus ou moins reculées, avec le continent africain. C'est en tous cas la conclusion qui se dégage de la lecture des diverses contributions parues dans le Mémoire déjà cité de la Société de biogéographie.

L'étude de la faune de divers groupes d'animaux permet de distinguer assez nettement un archipel oriental (Lanzarote et Fuerteventura) et un archipel occidental (Tenerife, Gomera, Hierro et Palma) ; l'île de Gran Canaria se rattache au groupe occidental, mais avec certains rapports avec le groupe oriental (Text-fig. 1). On

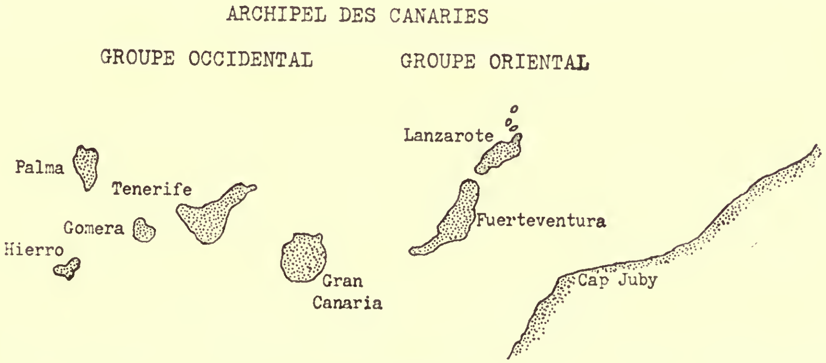


FIG. 1. Carte de l'archipel.

peut admettre que, de la presqu'île primitive, s'est détaché tout d'abord le groupe d'îles occidentales, dont le morcellement aurait débuté par la séparation de Gran Canaria, tandis que les îles orientales sont restées plus longtemps en contact avec le continent.

L'étude que j'ai faite des Sphécides canariens confirme de façon générale cette théorie, mais il reste cependant certains types de répartition difficiles à expliquer.

LISTE DES ESPÈCES

AMMOPHILA Kirby

Ammophila* (*Podalonia*) *tydei Le Guillou

Canaries (Brullé, 1840, *argentata* Lep.) ; Ten. (Le Guillou, 1841, Pérez, 1895, Saunders, 1903, 1904) ; G. Can., Ten. (Bischoff, 1937) ; G. Can. (Giner Mari, 1945) ; Ten., Gom., Palma (de Beaumont, 1954).

Fuert. Puerto del Rosario, 3 ♀.—G. Can. Cruz de Tejeda, Firgas, La Isleta, Maspalomas VI, 14 ♂ 9 ♀.—Ten. Aguamansa, La Esperanza, Las Mercedes vi–vii, La Vega, Pico de los Flores, P. Orotava, San Andrés, 7 ♂, 23 ♀.—Gom. Above Agulo, Chipude, Chipude Forest, Playa Calera, 3 ♂, 5 ♀.—Hierro. Above Frontera, Valverde, 1 ♂, 12 ♀.—Palma. Los Tilos, 2 ♂.

Spécimens semblables à ceux que j'ai précédemment décrits. Le type de l'espèce, capturé " près de l'embouchure même du volcan du pic de Ténérife " se trouve au Muséum de Paris.

Ammophila* (*Podalonia*) *mauritanica Mercet

Fuert. Corralejos, 17 ♂, 4 ♀.

Trouvée seulement dans les zones sablonneuses proches de la mer. De nombreux mâles ont été observés se rassemblant en dessus d'une femelle près d'éclore d'un cocon qui avait été déterré.

Ammophila* (*Podalonia*) *affinis concolor Brullé

Canaries (Brullé, 1840, *concolor* Br. et *nigra* Br.) ; Lanzarote (de Baumont, 1954).

Comme l'a noté Kohl (1906) à la suite de l'examen des types, les *Ammophila concolor* et *nigra* de Brullé sont les 2 sexes d'une même forme, que l'on peut considérer comme une sous-espèce mélanique d'*affinis* Kirby ; j'ai donné précédemment quelques indications sur cette race.

Ammophila (s.s.) ***sabulosa*** Linné

Canaries (Brullé, 1840).

Je doute de la présence aux Canaries de cette espèce, commune en Europe, mais rare en Afrique du nord.

Ammophila (s.s.) ***terminata*** Smith

Canaries (Brullé, 1840, *apicalis* Br.) ; Ten. (Saunders, 1904, Bischoff, 1937, *apicalis* Br.) ; Lanz., Fuert., Ten. (de Beaumont, 1954).

Lanz. Haria, Penas del Chache, 3 ♀.—Fuert. above Ampuyenta, Betancuria, Corralejos, Coti, Puerto del Rosario, 3 ♂, 6 ♀.—G. Can. Cruz de Tejeda, 2 ♂, 1 ♀.—Ten. La Esperanza v–vii, Las Mercedes, Los Cristianos, San Andrés, 7 ♂, 9 ♀.

Le matériel récolté par M. Guichard me permet de confirmer entièrement ce que j'avais dit sur la variation de cette espèce. Je puis cependant ajouter, fait intéressant, que les individus de Gran Canaria sont du même type de pilosité et de coloration que ceux de Fuerteventura et Lanzarote, soit semblables à ceux du continent.

SCELIPHRON Klug

Sceliphron (s.s.) ***spirifex*** (Linné)

Canaries (Brullé, 1840) ; Ten. (Bischoff, 1937).

G. Can. Maspalomas, 2 ♂.—Ten. Puerto de la Cruz, Puerto Orotava, 3 ♂, 7 ♀.

CERCERIS Latreille

Cerceris concinna Brullé

Canaries (Brullé, 1840) ; G. Can., Ten., Palma (Bischoff, 1937) ; Ten. (de Beaumont, 1954).

Lanz. Penas del Chache, 1 ♀.—G. Can. Maspalomas, 5 ♂, 6 ♀.—Ten. Adeje, Bn. del Infierno, Las Cañadas, La Esperanza, v–vii, Las Mercedes, vi–vii, Los Cristianos, Parador de Teide, Pico de los Flores, San Andrés, 25 ♂, 16 ♀.—Gom. above Agulo, Chipude, 6 ♂, 3 ♀.—Hierro. Frontera, 2 ♂.

Espèce endémique appartenant au groupe de *rybyensis* ; ses dessins rouge brique, d'extension un peu variable lui donnent un aspect bien caractéristique ; sa morphologie (en particulier la sculpture du clypéus de la ♀) ne permet pas de la rattacher subspécifiquement à une espèce continentale. Il y a une certaine variation insulaire. Ainsi, les ♂ de Tenerife, de Gomera et de Hierro ont les fémurs 3 noirs tachés de ferrugineux à l'apex et parfois, légèrement, à la base ; chez les 5 ♂ de Gran Canaria, les fémurs 3 sont entièrement ferrugineux. Il y a quelques autres petites différences de coloration et de sculpture, mais qui ne m'ont pas paru absolument constantes.

Cerceris lepida Brullé

Canaries (Brullé, 1840).

Cette espèce reste douteuse et elle pourrait bien, à mon avis, être simplement synonyme de *concinna* Brullé. Le ♂ seul a été décrit ; il s'agit d'un insecte dont la répartition des dessins clairs est très semblable à ce que l'on voit chez *concinna*, mais d'une couleur fauve et non rouge de brique. Le dessous des antennes est clair, le 2ème tergite avec une tache basale claire assez développée, les fémurs noirs sauf à l'apex. Comme je n'ai pas vu, dans les matériaux déjà abondants des Canaries que j'ai examinés, d'autres *Cerceris* que des *concinna*, j'aurais volontiers admis que *lepida* est synonyme. Cependant, dans sa monographie, Schletterer (1887) donne une description complète d'un *C. lepida* Brullé ♂, qui proviendrait des Canaries et dont des exemplaires se trouveraient au Musée de Vienne. Il s'agirait d'une espèce voisine d'*odontophora* Schletterer ; il faut remarquer qu'en divers points la description de Schletterer ne s'accorde pas avec celle de Brullé et ce sont sans doute deux espèces différentes. J'ajouterai que le type de *lepida* ne se trouve pas au Muséum de Paris (tandis que celui de *concinna* y est conservé) et qu'au Muséum de Vienne n'existe, sous le nom de *lepida*, aucun exemplaire provenant des Canaries.

PSEUDOSCOLIA Radoszkowski

Pseudoscolia dewitzi (Kohl)

Fuert. Corralejos, Puerto del Rosario, iv–v, 1 ♂, 11 ♀.

EREMIASPHECIUM Kohl

Eremiasphecium schmiedeknechti Kohl

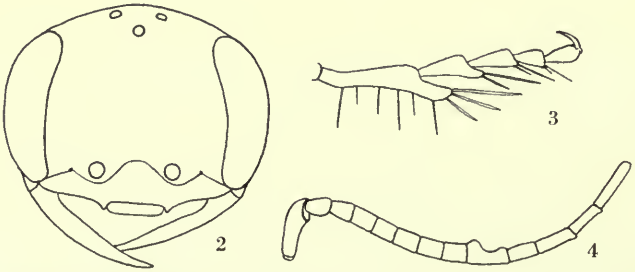
(Text-figs. 2–4)

G. Can. Maspalomas, 1 ♂, 5 ♀. Chassant sur on *Ononis* rampant attaqué par des larves d'Homoptères, et poussant dans les dépressions des dunes.

Le genre *Eremiasphecium* a été crée par Kohl (1897) pour l'espèce *schmiedeknechti* Kohl, récoltée en Egypte et qui n'avait pas été trouvée ailleurs. En 1930, Gussakovskij a décrit d'Asie centrale 6 espèces, qu'il place dans son nouveau genre *Shestakovia*. La synonymie de *Shestakovia* Gussak. avec *Eremiasphecium* Kohl a été reconnue par Pate (1937).

Grâce à l'obligeance du Dr M. Fischer, j'ai pu comparer les spécimens récoltés aux Canaries par M. Guichard à un couple de la série originale de Kohl, et j'ai pu constater leur identité morphologique. Kohl n'ayant figuré que l'aile antérieure, je donne ici des dessins de la tête, du tarse antérieur de la ♀, conformé un peu comme celui des *Laphyragogus*, et de l'antenne du ♂ ; ces dessins ont été exécutés d'après des spécimens des Canaries (Text-fig. 2–4).

Les dessins jaunes sont d'extension variable ; les 2 individus égyptiens que j'ai vus ont des dessins clairs moins étendus que ne les décrit Kohl : la bande arquée du vertex est interrompue au milieu, la ♀ n'a pas de stries discales au mésonotum



FIGS. 2–4. *Eremiasphecium schmiedeknechti* Kohl.—2. Tête ♀.—3. Tarse 1 ♀.—4. Antenne ♂.

et n'a de bandes que sur les 3 premiers tergites, le ♂ n'a que des traces de taches au propodéum. Les spécimens des Canaries ont au contraire des dessins jaunes plus étendus ; le scutellum de la ♀, par exemple, est presque entièrement jaune.

Quelle est la position systématique du genre *Eremiasphecium* ? D'après Kohl, il devrait se placer parmi les Philanthinae, au voisinage de *Pseudoscolia* Radoszkowski, tandis que, d'après Gussakovskij, on devrait le classer, parmis les Larrinae, aux côtés de *Solierella* Spinola, *Miscophus* Jurine et surtout *Ptygosphex* Gussakovskij. Je l'ai moi-même (1949) considéré comme un représentant des Philanthinae, et c'est également la place que lui assigne Menke (1967), en l'isolant dans la tribu nouvelle des Eremiaspheciini.

BEMBIX Fabricius

Bembix flavescens Smith

Canaries (Brullé, 1840, *olivacea* F.) ; Ten. (Smith, 1856) ; Ten., Gom., G. Can., Palma (Handlirsch, 1895) ; G. Can. (Bischoff, 1937, Giner Mari, 1945) ; G. Can., Ten., (de Beaumont, 1954).

G. Can. Maspalomas vi–viii, 19 ♂, 44 ♀.—Ten. Los Cristianos, P. Orotava, 14 ♂, 2 ♀.—Gom. Pl. Calera, 1 ♂, 12 ♀.

A la suite de Handlirsch (1893), j'avais signalé l'intéressante variation insulaire de cette espèce. Les individus récoltés par M. Guichard viennent confirmer ces observations ; j'ajouterai que les dessins clairs des spécimens de Gomera, glauques comme ceux de Tenerife, sont en moyenne moins développés ; chez une des ♀, toutes les bandes abdominales sont interrompues.

GORYTES Latreille

***Gorytes* (*Dienoplus*) *guichardi* sp. n.**

(Text-figs. 5–6)

Holotype ♀. Fuerteventura, Corralejos, 9.v.64, *K. M. Guichard* leg. B. M.

Paratypes. 8 ♀, id. ; 1 ♂, 3 ♀, Fuerteventura, Puerto del Rosario, 6.v.64 ; 1 ♂, 1 ♀ Lanzarote, Arrecife, 18.v.64. B.M., Mus. Lausanne.

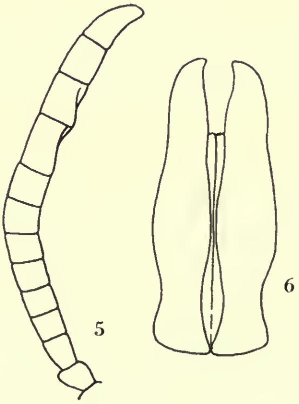
♀. 5·5–6·5 mm. Corps noir, sans coloration rouge sur le thorax ou l'abdomen ; mandibules ferrugineuses au milieu ; labre jaune ; clypéus jaune sur les côtés, toute sa partie médiane plus ou moins ferrugineuse et noire, l'extension de cette partie foncée étant variable ; des stries orbitaires, occupant en bas tout l'espace entre l'antenne et l'oeil, se rétrécissant vers le haut, où elles s'arrêtent bien avant le niveau de l'ocelle antérieur ; écusson frontal noir ou jaune ; une tache ferrugineuse au bord postérieur des yeux dans leur partie supérieure ; scutellum parfois avec des traces de couleur ferrugineuse au bord postérieur ou même, chez 2 individus, avec une étroite bande jaune ; 2ème tergite avec des taches latérales blanches, le 5ème avec une assez grande tache ; face inférieure des antennes plus ou moins ferrugineuse ; tibias 1 et 2 en bonne partie d'un jaune ferrugineux ; tibias 3 éclaircis dans leur motié basale seulement.

Clypéus avec une lamelle bien nette sur toute la largeur du bord antérieur, ne se rétrécissant pas au milieu ; le 3ème article des antennes un peu moins de 2 fois aussi long que large, le

4ème 2 fois aussi long que large ; la forme de la tête, vue de face, rappelle celle de *tumidus* Panzer et des espèces voisines : le rapport entre la largeur totale de la tête et la distance interoculaire minimum est de 2·1 ; front mat, à microponctuation très dense et de petits points espacés peu visibles ; sommet de la tête plus brillant, les points devenant de ce fait plus visibles ; POL : OOL = 5 : 2 ; OOL est égal ou un peu inférieur au diamètre d'un ocelle. Dos du thorax brillant, à microponctuation beaucoup moins dense que sur le front et des points plus gros (restant cependant assez petits) espacés, très nets ; mésopleures encore plus brillantes que le mésonotum, leur sculpture un peu cachée par la pilosité. Le propodéum est brillant, à microsculpture très peu développée ; son aire dorsale, peu nettement limitée, est parcourue par un sillon médian plus ou moins net et montre quelques courtes stries longitudinales à sa base ; le reste de la face dorsale du propodéum ne montre que de petits points isolés. Tergites 1 et 2 brillants, avec une microponctuation assez dense â la base, devenant très espacée dans leur partie postérieure ; la macroponctuation formée de points assez petits et espacés, mais bien nets ; tergites 3–5 à microponctuation dense, sans gros points ; aire pygidiale brillante, avec des points espacés. Pilosité relativement peu développée, un peu plus dense sur les mésopleures.

♂. 5·5 mm. Le clypéus est entièrement jaune, les stries orbitaires plus développées que chez la ♀, la face inférieure du funicule plus claire ; le reste comme chez l'autre sexe ; les 2 individus ont le scutellum noir. Sculpture des diverses parties du corps comme chez la ♀. Clypéus avec une étroite lamelle sur toute la largeur de son bord antérieur ; les antennes sont remarquablement courtes et épaisses ; vu de face, le 3ème article est à peine plus long que large (5 : 4), les articles suivants proportionnellement de plus en plus courts, le 9ème nettement plus large que long, le 10ème (vu de face également) n'est pas 2 fois plus long que large (4 : 3) ; les articles 10–11 faiblement échancrés en dessous, le 13ème peu courbé (Text-fig. 5) ; les articles des tarses sont normalement allongés ; les paramères de l'armature génitale sont translucides dans leur partie apicale, moyennement allongés (Text-fig. 6).

Cette nouvelle espèce se distingue de toutes celles que je connais de l'Afrique du nord soit par ses dessins clairs peu développés, soit par sa sculpture fine, en particulier sur le propodéum, soit par la forme de la tête ou du clypéus ; la pilosité est moins développée que chez les espèces marocaines *funereus* Giner Mari et *arenarum* de Beaumont, qui sont par ailleurs différentes par leur coloration et leur sculpture. La brièveté des articles du funicule du ♂ est caractéristique.



Figs. 5–6. *Gorytes guichardi* sp. n. ♂.—5. Antenne.—6. Armature génitale.

ASTATA Latreille

Astata (s.s.) spp. aff. ***boops*** (Schrank)

G. Can. (Bischoff, 1937, *minor* Kohl, de Beaumont, 1954, *boops* Schrk).

Lanz. Haria, 4 ♂.—G. Can. Cruz de Tejeda, 1 ♂.

Faute d'un matériel suffisant, je n'ai malheureusement pas pu tirer au clair la situation des quelques *Astata* s.s. que j'ai vues, provenant des Canaries. Bischoff (1937) a signalé de Gran Canaria une ♀ d'*Astata minor* Kohl ; de la même île, j'ai moi-même cité 2 ♀ sous le nom de *boops* Schrank, disant qu'elles se distinguaient par leur petite taille.

J'ai maintenant ces 3 ♀ sous les yeux ; elles sont semblables et ne sont ni *minor* ni *boops*, mais se rapprochent cependant beaucoup de cette dernière espèce. La ponctuation du front et de l'aire interocellaire est un peu moins dense que chez *boops*, celle du mésonotum, par contre un peu plus dense. Sur le métatarse antérieur, le peigne est disposé à peu près comme chez boops, mais la " grande épine " où s'arrête la frange de poils est située au milieu de la longueur et non dans la moitié basale ; la face inférieure montre une épine subapicale et une épine médiane. Le 2ème sternite montre des soies brunes dressées et sur les fémurs postérieurs, les soies sont plus fortes que chez *boops*. Ces ♀ se distinguent de *gallica* de Beaumont par leurs joues plus courtes, la ponctuation beaucoup plus dense du front et la sculpture dense des mésopleures ; elles se distinguent de *boops* par les caractères signalés ci-dessus ; elles se séparent de *cobosi* Giner par leur taille plus faible, l'absence de soies noires aux hanches, la ponctuation du mésonotum ; elles se rapprochent beaucoup de *boops graeca* de Beaumont, mais s'en distinguent cependant par divers détails de sculpture et de pilosité.

Le seul ♂ de Gran Canaria doit-il être associé à ces ♀ ? Ce n'est pas certain ; quoi qu'il en soit, par la structure des ses antennes, il n'appartient à aucune des espèces citées ci-dessus. Quant aux ♂ de Fuerteventura, ils sont encore différents ! Voisins de *cobosi* par leur sculpture et leur 2ème sternite sans tache noire, ils n'ont pas les mêmes carènes aux articles des antennes.

Astata (***Dryudella***) ***bifasciata*** von Schulthess

Lanz. Arrecife, 2 ♂.—Fuert. Gran Tarajal, Puerto del Rosario, iv–v, 19 ♂, 8 ♀.—G. Can. Maspalomas, 12 ♂, 9 ♀.—Ten. Las Cañadas, v–vi, Los Cristianos, 4 ♂, 5 ♀.

Astata (***Dryudella***) ***sepulchralis*** **sp. n.**

(Text-figs. 7–8)

Holotype ♂. Lanzarote, Arrecife, 18.v.64, *K. M. Guichard* leg. B.M.

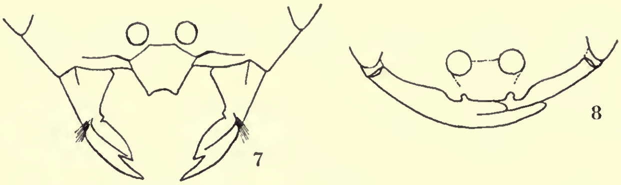
Paratypes. 4 ♂, 1 ♀, Lanzarote, Tahiche, 23.v.64 ; 4 ♂, 7 ♀, Fuerteventura, Corralejos, 9–10.v.64 ; 12 ♂, 4 ♀, Fuerteventura, Puerto del Rosario, 27.iv–12.v.64. B.M., Mus. Lausanne.

♀. 5–6 mm. Tête, thorax (tubercules huméraux compris) et abdomen noirs ; l'aire pygidiale plus ou moins ferrugineuse à l'extrémité ; mandibules ferrugineuses à pointe foncée ;

genoux, tibias et tarses plus ou moins ferrugineux ; mise à part une très petite tache à la base du stigma, la nervulation est foncée.

La lamelle, au bord antérieur du clypéus présente, chez tous les individus, deux incisions profondes et assez larges (Text-fig. 8) ; le bord antérieur des lobes latéraux est peu arqué. La sculpture des diverses parties du corps, comparée à celle d'une ♀ de *tricolor* van der Linden de l'Europe du S.-O., ne présente que peu de différences ; la microsculpture est un peu plus développée sur la tête et sur le dos du thorax ; elle l'est par contre un peu moins sur les mésopleures et sur le propodéum, dont la face dorsale, en particulier, est beaucoup moins mate, sans stries. La pilosité blanche des tempes est un peu plus développée. Fémurs 1 portant sur leur face inférieure des soies dont les plus développées sont un peu moins longues que le diamètre du fémur ; la face inférieure des fémurs 3 avec une rangée de 6–7 soies, les plus développées étant presque aussi longues que le diamètre maximum du fémur, vu de profil. La cellule radiale est courte : sa longueur au bord antérieur, depuis l'extrémité du stigma, est égale â sa hauteur maximum (dimensins intérieures).

♂. 5–6 mm. Corps entièrement noir ; tibias et tarses 1 en grande partie d'un ferrugineux plus ou moins jaunâtre ; tarses 2 et 3 d'un ferrugineux sombre.



Figs. 7–8. *Astata sepulchralis* sp. n.—7. Clypéus et mandibules ♂.—8. Id. ♀.

Mandibules sans lobe au bord inférieur, ressemblant beaucoup à celle de *beaumonti* Pulawski, (1959) ; le clypéus ressemble aussi á celui de cette espèce, le bord antérieur du lobe médian un peu plus étroit, le bord antérieur des lobes latéraux très peu arqué (Text-fig. 7). Face antérieure de la tête nettement microsculptée, assez mate ; la région où chez les espèces voisines se trouve une tache blanche est plus brillante, mais cependant microsculptée. La sculpture du thorax et du propodéum n'est pas très différente de ce que l'on voit chez la ♀, l'ensemble cependant plus brillant, en particulier sur la face dorsale du propodéum. Cellule radiale un peu plus longue que chez la ♀.

Par la forme des mandibules et du clypéus du ♂, cette nouvelle espèce est proche de *bifasciata* von Schulthess, *monticola* Giner Mari (voir de Beaumont, 1962), et surtout de *beaumonti* Pulawski. Elle se distingue de toutes ces espèces par la coloration foncée, les nervures foncées jusqu'à la base de l'aile, l'absence de tache blanche sur le front du ♂. Le ♂ se distingue encore de *monticola* et *beaumonti* par le bord antérieur des lobes latéraux du clypéus très peu arqués, la face dorsale du propodéum beaucoup plus brillante ; la ♀ se distingue de celle de *beaumonti* par les profondes échancrures de la lamelle du clypéus, les longues soies des fémurs, la face dorsale du propodéum beaucoup plus brillante, la cellule radiale plus courte.

LIRIS Fabricius

Liris haemorrhoidalis (Fabricius)

Ten. (Schletterer, 1889) ; G. Can. (Pérez, 1895, *rubricans* Pér.) ; Ten. (de Beaumont, 1954).

Liris nigricans (Walker)

Canaries (de Beaumont, 1961).

G. Can. Maspalomas vi–viii, 2 ♂, 12 ♀. Chassant des *Gryllus* dans des zones humides.

Liris atrata (Spinola)

Canaries (Brullé, 1840, *nigrita* Lep.) ; Ten. (Schletterer, 1889) ; Ten., Palma (de Beaumont, 1954).

Fuert. Betancuria, Puerto del Rosario, 2 ♀.—G. Can. Maspalomas, 2 ♂.—Ten. Los Cristianos, 1 ♂.

Liris agilis (Smith)

Canaries (Brullé, 1840, Tachytes nigra v.d. Lind., de Beaumont, 1961).

Ten. San Andrés, 1 ♂.

TACHYSPHEX Kohl

Tachysphex panzeri fortunatus **ssp. n.**

Holotype ♀. Gran Canaria, Maspalomas, 17.vi.64, *K. M. Guichard* leg. B.M.

Paratypes. 13 ♂, 12 ♀, Ibid., 17–23.vi.64, 17–28.vi.66 ; 1 ♀, Gran Canaria, La Isleta, 18.vi.64. B.M., Mus. Lausanne.

Ces spécimens présentent les caractères généraux de *T. panzeri* van der Linden : sculpture et pilosité des diverses parties du corps, forme générale du clypéus des 2 sexes, épaisseur des fémurs et aire pygidiale de la ♀, peigne du tarse antérieur et armature génitale du ♂.

Ils se distinguent tout d'abord par leur mélanisme : le corps est noir chez les 2 sexes. Sont ferrugineux sur les pattes de la ♀ : la plus grande partie des fémurs, les tibias et les tarses ; chez le ♂, les fémurs ne sont ferrugineux qu'à l'apex et les tibias sont plus ou moins rembrunis. Chez le ♂, la pilosité de la face est dorée, devenant un peu argentée dans le bas chez les petits individus ; chez les 2 sexes, il y a des bandes de pruinosité sur les 3 premiers tergites seulement ; les ailes ne sont pas enfumées.

Morphologiquement, on peut noter une très grande variation dans la taille des ♀ : de 9·5 à 15 mm. Chez la ♀, le clypéus est un peu plus allongé que chez la forme typique, ce qui est dû à un plus grand développement de la partie apicale brillante et une courbure plus accentuée du bord antérieur ; chez le ♂ également, le clypéus est plus allongé. Je me suis demandé s'il fallait attribuer à ces différences du clypéus une valeur spécifique, mais je préfère, étant donné la grande variation de *T. panzeri*, considérer cette forme insulaire comme sous-espèce.

Tachysphex costai canariensis **ssp. n.**

Holotype ♀. Gran Canaria, Maspalomas, 28.vi.66, *K. M. Guichard* leg. B.M.

Paratypes. 18 ♂, 1 ♀, Ibid., 17–23.vi.64, 17–28.vi.66, 16.viii.66, B.M., Mus. Lausanne.

J'ai précédemment indiqué (1954*b*) que *T. costai* Destefani présentait une variation géographique dans sa coloration, l'abdomen pouvant être rouge à la base chez les 2 sexes (Europe du S.-O., Afrique du N.-O.), noir chez le ♂ et rouge à la base chez la ♀ (Italie, Balkans) ou noir chez les 2 sexes (Israël). J'ai noté également les caractères structuraux qui permettent de distinguer *costai* de l'espèce voisine *erythropus* Spinola.

Les individus de Gran Canaria sont mélaniques, ayant l'abdomen noir chez les 2 sexes, avec la dépression terminale et les côtés rabattus du 1er tergite plus ou moins ferrugineux. Ils diffèrent encore des individus de l'Europe du S.-O., et du Maroc par le mésonotum et le scutellum plus brillants, ce qui est dû à une absence presque complète de microsculpture chez la ♀, son faible développement chez le ♂ et à la ponctuation plus espacée. Ces caractères me paraissent suffisants pour justifier la création d'une sous-espèce.

Tachysphex nitidus (Spinola)

Lanz. Arrecife, Haria, Penas del Chache, Tahiche, 7 ♂, 11 ♀.—Fuert. above Ampuyenta, Betancuria, Coti, Puerto del Rosario, iv–v, 6 ♂, 19 ♀.

Par leur structure générale, leur sculpture, la forme du clypéus chez les 2 sexes, l'armature génitale du ♂, ces individus se placent dans le cadre général de *nitidus*. Au Maroc, comme je l'avais indiqué (1955), l'espèce présente une assez grande variation géographique ; les individus de Fuertventura et Lanzarote ressemblent à ceux du Maroc méridional, ayant en particulier le vertex relativement étroit ; chez la ♀, la distance interoculaire est à peu près égale à la longueur des articles 1 et 2 du funicule ; chez les *nitidus* ♀ d'Europe, cette distance est nettement plus grande.

Tachysphex simonyi Kohl

Canaries (Brullé, 1840, *unicolor* Panz.) ; G. Can. (Kohl, 1892) ; Ten. (Saunders, 1903, 1904, de Beaumont, 1954).

G. Can. Cruz de Tejeda, El Palmital, Maspalomas, 18 ♂, 2 ♀.—Ten. Las Cañadas, La Esperanza, Las Mercedes, Los Cristianos, 58 ♂, 19 ♀.—Gom. Chipude, 1 ♂, 1 ♀.—Hierro. above Frontera, below Sabinosa, Valverde, 9 ♂, 10 ♀.

J'ai donné il y a 20 ans (1947) des renseignements sur cette espèce, très voisine de *nitidus*. L'examen attentif de l'abondant matériel de ces 2 espèces récolté par M. Guichard dans les diverses îles canariennes m'a permis de constater que leur parenté était encore plus proche que je ne le supposais. Si l'on compare en effet les *simonyi* des îles occidentales aux *nitidus* de Fuerteventura et Lanzarote, on constate qu'il n'y a que très peu de différence dans la structure et la largeur du vertex et que la distinction des ♂ par leur armature génitale n'est pas toujours convaincante. La différence la plus nette et la plus constante se voit dans la sculpture des mésopleures de la ♀ ; chez *nitidus*, la ponctuation est nette et très dense, les espaces étant plus petits que les points ; chez *simonyi*, la ponctuation est nettement plus fine et plus espacée, sur un fond microsculpté, et disparait à peu près complètement dans la partie postérieure ; on peut noter aussi que, chez la ♀ de *simonyi*, l'aire apicale brillante du clypéus est en général plus étendue vers la base et moins nettement limitée.

On voit donc que les différences entre les 2 espèces sont très faibles et peut être serait-il plus logique de considérer *simonyi* comme sous-espèce de *nitidus*.

Tachysphex sp. aff. ***nitidus*** (Spinola)

Fuert. Coti, Puerto del Rosario, 1 ♂, 3 ♀.—Ten. Adeje, Los Cristianos, iv–vii, 2 ♂, 2 ♀.

Ces individus se distinguent de *nitidus* par leur faible taille, la présence de bandes de pruinosité sur les 4 premiers tergites, la pilosité un peu plus développée sur le thorax et le propodéum, les derniers articles des tarses nettement ferrugineux, les épines des pattes claires, les ailes hyalines à nervulation plus pâle ; la sculpture est fine ; les ♂ se distinguent encore par le 4ème article des antennes un peu plus court, les épines un peu plus développées aux tarses 1 (mais cependant moins que chez *filicornis* par exemple) ; il y en a généralement 2 à l'extrémité du métatarse.

Cette forme existe aussi au Maroc, à côté de *nitidus*. Si je ne l'ai pas décrite jusqu'à présent comme espèce distincte, c'est parce que je n'ai pas encore réussi à préciser ses rapports avec certains "*nitidus*" d'Europe, qui lui ressemblent beaucoup.

Tachysphex filicornis Kohl

Ten. San Andrés, 27.ii.66, *R. T. Simon Thomas* leg., 1 ♂.

Cet individu présente tous les caractères principaux de *filicornis* tels que je les ai définis (1954*b*) et ne diffère guère des individus marocains de cette espèce ; j'aurais cependant bien désiré voir une ♀.

MISCOPHUS Jurine

Miscophus deserti Berland

Lanz. Arrecife, 1 ♂.—Fuert. Corralejos, Coti, Gran Tarajal, Puerto del Rosario, iv–v, 7 ♂, 8 ♀.

En tentant d'identifier ces spécimens à l'aide du travail de Andrade (1954), j'ai hésité d'abord entre *gallicus* Kohl, *deserti* Berland et *ceballosi* de Andrade. La coloration claire des pattes aurait amené à *ceballosi*, détermination qu'exclut les proportions du propodéum en particulier ; la pruinosité du front tout à fait argentée exclut de même *gallicus*. L'on est donc amené à *deserti*, au sens que lui donne de Andrade, mais les spécimens de Fuerteventura et Lanzarote diffèrent de ceux que je possède du Maroc par leur coloration ferrugineuse plus développée ; une grande partie des fémurs 3 est de cette couleur de même que l'abdomen en entier de certaines ♀. Il y a d'ailleurs à ce point de vue une certaine variation, de même que pour la couleur de la lamelle du bord antérieur du clypéus.

Jusqu'à plus ample informé, j'admets que ces individus représentent une race rufinisante de *deserti*.

Miscophus primogeniti de Andrade

G. Can. (Bischoff, 1937, *eatoni* Saund., de Andrade, 1954).

G. Can. Cruz de Tejeda, El Palmital, La Isleta, Maspalomas, 5 ♂, 9 ♀.

La ♀ seule a été décrite. Le ♂ est très semblable, et facile à reconnaître à son corps et ses pattes noires, ses ailes assez fortement enfumées.

Miscophus albomaculatus de Andrade

Fuert. Corralejos, Puerto del Rosario, 1 ♂, 2 ♀.

Dans son étude des *Miscophus* du groupe de *bicolor*, de Andrade (1960) reconnait un sous-groupe *aenigma*, qui comprend de petites espèces finement sculptées, ayant les articles du funicule courts, le 1er pas distinctement plus court que le 2ème, les tarses courts et épais, etc. ; parmi ces espèces, il place en premier lieu *albomaculatus*, basée sur une seule ♀ récoltée en Israël et qui se reconnait entre autres par un caractère bien spécial, probablement unique dans le genre *Miscophus* : une tache blanche bien nette sur la partie supérieure des tubercules huméraux.

J'ai été bien étonné de trouver dans le matériel récolté par M. Guichard aux Canaries 1 ♂ et 2 ♀ correspondant très exactement à la description de *albomaculatus*. Grâce à l'obligeance de mon collègue Verhoeff, j'ai pu examiner le type de l'espèce et constater que les spécimens des Canaries ne s'en distinguent que par de minimes détails : la couleur des tegulae, des plaques précostales et des tibias tire davantage sur le blanchâtre, le front est un peu plus mat, la face dorsale du propodéum est dépourvue de petites stries transversales (d'ailleurs peu visibles chez le type). Ce sont là des différences qui n'excèdent pas celles que l'on peut constater, chez d'autres espèces, entre deux populations, par exemple, et je ne crois pas devoir créer une sous-espèce distincte, d'autant plus qu'il pourrait bien exister des intermédiaires.

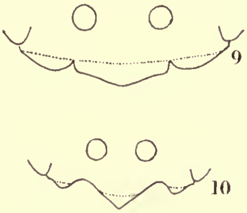
Le ♂, inconnu de Andrade, montre la tache blanche caractéristique sur les tubercules huméraux ; la couleur blanche est par ailleurs plus étendue que chez la ♀ ; sont de cette couleur : la face inférieure des scapes, les tegulae, les plaques précostales, une grande tache à l'extrémité des fémurs 1, une tache plus petite aux fémurs 2, les tibias (lignés de brun en arrière) et les premiers articles des tarses. Pour autant qu'on puisse la voir (l'individu est un peu englué de colle), la sculpture est semblable à celle de la ♀ ; les articles des antennes sont courts comme chez celle-ci ; le bord antérieur du lobe médian du clypéus est très peu saillant, largement arqué avec un angle médian très peu marqué.

***Miscophus canariensis* sp. n.**

(Text-figs. 9–10)

Espèce faisant partie du sous-groupe de *nicolai* Ferton, tel que le définit de Andrade (1960) et présentant deux races insulaires.

♀. 4–4·75 mm. La coloration sera décrite plus loin. Lobe médian du clypéus brillant, sa partie médiane bombée à ponctuation espacée, son bord antérieur assez fortement saillant, formant au milieu un angle assez largement arrondi (Text-fig. 9) : bords internes des yeux légèrement convergents dans leur partie inférieure ; front microscopiquement chagriné avec de plus une fine ponctuation ; celle-ci est très dense dans le bas et les téguments apparaissent mats, avec des traces d'une ligne médiane brillante ; vers le haut du front, la fine ponctuation est un peu plus espacée, et les téguments deviennent plus brillants ; dans l'aire interocellaire, les espaces sont plus petits ou à peu près aussi grands que les points ; les ocelles postérieurs sont situés peu en avant (moins d'un diamètre ocellaire) de la ligne idéale joignant l'angle supérieur des yeux. Collare bien développé, un peu gibbeux au milieu (comme chez *verhoeffi* Andr.), brillant, à ponctuation espacée ; le mésonotum et le scutellum sont brillants aussi, à peine microsculptés, avec une fine ponctuation, les espaces plus grands que les points ; mésopleures beaucoup moins brillantes, à microsculpture nette et ponctuation beaucoup plus dense. Face dorsale du propodéum mate (au moins dans toute sa partie centrale), ponctée, avec une carène médiane toujours nette d'où se détachent de très fines stries, plus ou moins développées selon les individus, transversales ou obliques, qui n'atteignent pas les bords latéraux ; faces latérales du propodéum assez brillantes, mais montrant cependant une microsculpture nette et une fine ponctuation, les espaces nettement plus grands que les points. Métatarse antérieur avec 2 épines bien développées et souvent une 3ème, basale, plus courte. Il ne me parait pas indispensable de donner les diverses mensurations de la tête et de la région ocellaire, qui ne permettent pas de distinguer cette espèce de celles qui lui sont proches.



FIGS. 9–10. *Miscophus*, clypéus.—9. *canariensis* sp. n. ♀.—10. *canariensis* sp. n. ♂.

♂. 3–3·5 mm. Le lobe médian du clypéus est saillant, formant un angle très net au milieu, les lobes latéraux sont fortement proéminents aussi (Text-fig. 10).

On peut distinguer deux races, l'une habitant Tenerife, l'autre Gran Canaria, distinctes par leur coloration et, à un plus faible degré, par leur sculpture.

***Miscophus canariensis canariensis* ssp. n.**

Holotype ♀. Tenerife, Los Cristianos, 17.iv.64, *K. M. Guichard* leg. B.M.
Paratypes. 10 ♂, 8 ♀, Ibid., 17.iv.64, 19.vii.66. B.M., Mus. Lausanne.

La tête et la face dorsale du thorax des reflets bronzés assez nets. Sont ferrugineux (plus jaunâtre par endroits, plus foncé à d'autres) : les mandibules, une partie plus ou moins étendue du clypéus, les 2 premiers articles des antennes et une partie du 3ème, une partie des tubercules huméraux, les tegulae et les plaques précostales, les pattes depuis l'extrémité des hanches. Ailes avec une zone subapicale foncée nette.

***Miscophus canariensis nigrifemur* ssp. n.**

Holotype ♀. Gran Canaria, Maspalomas, 28.vi.66, *K. M. Guichard* leg. B.M.
Paratypes. 6 ♂, 13 ♀, Ibid., 17–23.vi.64, 17–28.vi.66, 16.viii.66 ; 1 ♂, Gran Canaria, El Palmital, 24.vi.66. B.M., Mus. Lausanne.

La tête et la face dorsale du thorax à reflets bronzés très indistincts. La coloration ferrugineuse est moins étendue que chez la race typique, comprenant : les mandibules, les 2 premiers articles des antennes (foncés en dessus), les tibias et les tarses, ceux des pattes postérieures généralement plus ou moins obscurcis. La ponctuation de la tête, de la face dorsale du thorax et du propodéum est un peu plus dense.

Dans le sous-groupe de *nicolai*, cette nouvelle espèce se place parmi celles qui n'ont pas l'aire ocellaire particulièrement avancée, soit : *verhoeffi verhoeffi* de Andrade, de la péninsule ibérique et la France méridionale, *verhoeffi nitidus* de Andrade (bien différent du précédent par sa sculpture) de l'Algérie et du Maroc, *corsicus* de Andrade (une ♀ connue) de Corse, *gibbicollis* Giner Mari, du Maroc méridional et du Sahara espagnol et *clypearis* Honoré (♀ décrite par Pulawski 1964) d'Egypte.

Chez *verhoeffi*, les pattes sont noires, le bord antérieur du clypéus du ♂ n'est pas anguleux ; chez la forme typique (mais pas chez *nitidus*) les faces latérales du propodéum sont nettement striées.

Le type unique de *corsicus* que m'a aimablement communiqué mon collègue Verhoeff, est malheureusement en piteux état, privé de tête, de pronotum et d'abdomen ; la coloration est celle de *canariensis canariensis*, avec cependant des taches jaunes à l'extrémité des fémurs 1 et 2 ; la microsculpture plus développée rend le thorax et le propodéum plus mats ; sur la face dorsale du propodéum, la carène médiane est vestigiale et les stries plus irrégulières ; la ponctuation des parties latérales de la face dorsale et des faces latérales est beaucoup plus dense.

De *gibbicollis*, j'ai examiné le ♂ d'Agadir de la collection Verhoeff ; d'après la description, la ♀ est colorée comme *canariensis canariensis*, mais, chez le ♂, les fémurs sont plus obscurcis ; le corps est beaucoup plus brillant que chez *canariensis*, le collare assez différent.

Mon collègue Pulawski a bien voulu m'envoyer à l'examen une ♀ de *clypearis* ; la coloration est celle de *canariensis nigrifemur*, mais les ailes sont plus faiblement et plus régulièrement enfumées avec (chez l'individu examiné tout au moins) une très petite 2ème cellule cubitale ; le bord antérieur du lobe médian du clypéus est plus régulièrement arqué, la face dorsale du propodéum plus brillante, plus nettement ponctuée, presque sans stries.

Il n'est pas exclu que par la suite, l'on soit amené à admettre des relations subspécifiques entre certaines de ces formes.

Miscophus pseudomimeticus de Andrade

Fuert. Betancuria, Corralejos, Valle Canarios, 2 ♂, 1 ♀.—G. Can. Maspalomas, 1 ♀.

La ♀ de Fuertoventura est très semblable à une ♀ d'Agadir de ma collection, s'en distinguant par les tibias et les tarses presque entièrement obscurcis, les 2 premiers segments abdominaux, par contre, d'un ferrugineux sombre. Je rattache à cette espèce la ♀ de Gran Canaria, mais peut être devra-t-on, avec un matériel plus abondant, séparer subspécifiquement cette forme ; elle se distingue par une coloration plus foncée : les antennes, les pattes et l'abdomen sont noirs ; la sculpture de la tête, du dos du thorax et du propodéum est semblable, mais la ponctuation des mésopleures est un peu moins dense.

Quant aux 2 ♂ de Fuerteventura, ils me laissent dans le doute, car les téguments, en particulier sur les mésopleures, sont plus brillants, avec une ponctuation plus espacée (moins espacée sur les mésopleures que chez *littoreus* de Andrade, cependant) ; si ce sont bien des *pseudomimeticus*, le dimorphisme de la sculpture serait plus accusé que d'habitude ; ces 2 ♂ présentent unesparticularité qui semble unique : les 2 pointes médians de l'extrémité du 8 ème ternite sont remplacées par une pointe unique.

Miscophus eatoni Saunders

Ten. (Saunders, 1903, de Andrade, 1954).
Ten. Los Cristianos, iv–vii, 3 ♂, 7 ♀.

Cette espèce fait partie d'un groupe difficile de formes noires, sans particularités spécifiques très marquées ; elle est de plus répandue et géographiquement variable. La race typique est précisément celle de Tenerife, et il me semble utile de préciser encore certaines de ses caractéristiques.

Tête et face dorsale du thorax avec des reflets bronzés nets, surtout chez la ♀. Chez cette dernière, la ponctuation du front est très dense dans toute sa partie médiane, et l'on peut parler d'une microréticulation, assez régulière, rendant les téguments mats ; sur le dos du thorax, les espaces sont un peu plus grands que les points ; chez le ♂, la sculpture est un peu moins dense et les mésopleures, en particulier, sont très peu ponctées ; chez les 2 sexes, la face dorsale du propodéum montre une carène médiane très nette et des stries, très nettes aussi et peu sinueuses, divergeant obliquement depuis le postscutellum et perpendiculairement à la carène médiane sur tout le reste de la surface.

Miscophus nitidior sp. n.

Holotype ♀. Gran Canaria, Maspalomas, 17.vi.66, *K. M. Guichard* leg. B.M.

Paratypes. 3 ♂, 3 ♀, Ibid., 17.vi.64, 17–28.vi.66 ; 3 ♂, 1 ♀, Gran Canaria, El Palmital, 24.vi.66 ; 1 ♂, Gran Canaria, Cruz de Tejeda, 22.vi.66, B.M., Mus. Lausanne.

Espèce très voisine de la précédente.

♀. Corps et appendices noirs ; pas de reflets bronzés ; les nervures sont presque noires aussi, l'apex des ailes, après les cellules, plus nettement enfumé que chez *eatoni*.

Les mensurations des diverses parties de la tête sont dans les limites de ce que l'on observe chez *eatoni*. Lobe médian du clypéus très brillant, avec des points très fins, séparés par des espaces beaucoup plus grands qu'eux mêmes ; son bord antérieur largement arrondi, séparé des lobes latéraux par des échancrures plus étroites que chez *eatoni* ; la sculpture du front est moins dense que chez cette espèce, la réticulation de la partie inférieure faisant place dans le haut à une ponctuation assez nette, les espaces restant plus petits que les points, mais les téguments, dans leur ensemble, assez brillants ; dans l'aire interocellaire et les zones avoisinantes, les espaces sont, par endroits, plus grands que les points. Collare comme chez *eatoni* ; ponctuation du dos du thorax nettement plus espacée que chez cette espèce, les espaces beaucoup plus grands que les points ; ponctuation des mésopleures très espacée aussi ; sculpture du propodéum assez semblable à celle d'*eatoni*, la striation des faces latérales moins dense et souvent un peu effacée.

Le ♂ présente les mêmes caractères de sculpture que la ♀, mais avec la ponctuation encore plus espacée.

Les différences entre *nitidior* et *eatoni* sont assez subtiles et il est probable que, sans matériel de comparaison, l'identification serait très difficile. Ces différences sont cependant assez évidentes lorsque l'on a les insectes sous les yeux, l'absence de reflets métalliques et les téguments plus brillants donnant à *nitidior* un aspect assez différent. J'admets cependant la possibilité que, par la suite, l'on établisse des relations subspécifiques entre ces deux formes.

Remarque :

Les récoltes de M. Guichard renferment encore 1 ♂ de Gomera (Chipude, 1300 m., 4.viii.66), voisin de *nitidior*, mais qui pourrait bien représenter encore une nouvelle espèce. Il se distingue des ♂ de *nitidior* par sa taille plus grande, la ponctuation un peu plus espacée des côtés du front, mais nettement plus dense du dos du thorax, la striation un peu effacée de la face dorsale du propodéum, absente sur les faces latérales qui ne montrent que des points tout à fait isolés sur un fond très brillant ; la 2ème nervure récurrente aboutit assez près du milieu de la 2ème cellule cubitale. J'ai étiqueté cet individu " sp. aff. nitidior ".

***Miscophus guichardi* sp. n.**

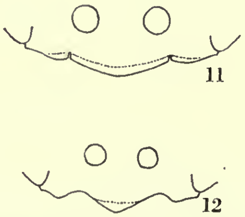
(Text-figs. 11–12)

Holotype ♀. Fuerteventura, Puerto del Rosario, 27.iv.64, *K. M. Guichard* leg. B.M.

Paratypes. 1 ♂, 3 ♀, Ibid., 17.iv–6.v.64 ; 2 ♂, 3 ♀, Fuerteventura, Corralejos, 9–10.v.64 ; 4 ♀, Lanzarote, Tahiche, 24.v.64. B.M., Mus. Lausanne.

Espèce faisant partie du sous-groupe de *bicolor*.

♀. 4–4·25 mm. Corps et appendices noirs, sans reflets bronzés, à peine teinté de ferrugineux sombre à l'extrémité des tegulae et sur les mandibules ; ailes hyalines jusqu'à l'extrémité des cellules, assez peu enfumées dans leur partie apicale, les nervures foncées. Lobe médian du clypéus avec une lamelle assez étroite, largement arquée, séparée des lobes latéraux par de très étroites incisions (Text-fig. 11) ; front très finement sculpté, plus finement que chez *ater* Lepeletier ; dans toute sa partie inférieure et médiane, il est mat et, à × 100 la sculpture apparait formée d'une très fine ponctuation très dense, mais les points n'apparaissent pas distinctement ; dans la partie supérieure du front et dans la région des ocelles, les téguments sont plus brillants, car les points, toujours très fins, sont séparés par d'étroits espaces brillants ; dans l'aire interocellaire, la ponctuation est de nouveau plus dense ; les yeux convergent fortement vers le vertex, ce qui donne un rapport largeur maximum de la face/distance interoculaire au vertex = 1·85–2 ; cette distance interoculaire est égale ou un peu supérieure à la longueur des articles 2 + 3 des antennes, inférieure en tous cas à 2 + 3 + 1/2 4 ; le triangle ocellaire a un sommet très aigu et se trouve relativement avancé sur le front ; cela donne les



FIGS. 11–12. 11 *guichardi* sp. n. ♀.—12. *guichardi* sp. n. ♂.

rapports POL/Diamètre d'un ocelle/OOL/SOL/VOL = 6/6/3/7/5 ou, chez d'autres individus : 6/5/4/7/4. Le collare est très peu développé et situé presque au niveau du mésonotum ; si l'on examine le collare d'*ater* Lepeletier ou *eatoni* Saunders, par exemple, on remarque que le bord postérieur, contre le mésonotum, est nettement déprimé et que la partie surélevée qui se trouve en avant forme une gibbosité médiane bien nette ; chez *guichardi*, le bord postérieur est à peine déprimé et la saillie médiane faiblement indiquée seulement. Mésonotum brillant, avec une fine ponctuation, peu nettement enfoncée, les espaces plus grands que les points, un peu striolés en travers ; sur le scutellum, la ponctuation est plus nette et plus espacée ; mésopleures brillantes, toute leur partie inférieure avec une sculpture irrégulière formée de points et de stries, la partie supérieure peu sculptée. Propodéum brillant ; sa face dorsale avec une carène médiane nette et d'assez nombreuses stries (plus nombreuses que chez *eatoni* par exemple), se détachant obliquement du bord antérieur et de la partie antérieure de la carène médiane, presque transversalement en arrière ; une très forte carène entre les faces supérieure et postérieure ; faces latérales avec de nombreuses stries obliques un peu sinueuses. Tergites brillants avec une très fine ponctuation peu nettement enfoncée. Peigne formé sur le métatarse de 2 courtes épines, l'apicale atteignant à peu près la moitié de l'article suivant.

♂. 3·75 mm. Coloration comme chez la ♀. Sur les diverses parties du corps, les téguments sont, comme toujours, un peu plus brillants que chez la ♀, avec une sculpture moins dense. Bord antérieur du lobe médian du clypéus bien saillant en ogive (Text-fig. 12) ; les yeux convergent moins vers le vertex que chez la ♀, ce qui donne une distance interoculaire égale à la longueur des articles 2 + 3 + 4 des antennes et un rapport largeur de la face/distance interoculaire = 1·55–1·6 ; corrélativement, le triangle ocellaire est moins aigu et moins avancé et les rapports signalés chez la ♀ sont 6/5/3/6/2.

Dans le sous-groupe de *bicolor*, *guichardi* se place parmi les espèces, assez difficiles à distinguer, qui n'ont pas de particularités morphologiques très notables et le corps et les appendices noirs. La structure du collare et la très fine sculpture la distinguent dans les deux sexes ; chez la ♀, de plus, la forme du clypéus est caractéristique, de même que la forte convergence des yeux au vertex ; on notera encore la sculpture de la face dorsale du propodéum, à stries assez régulières, et le faible développement du peigne de la ♀.

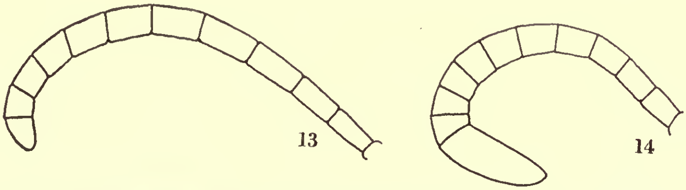
SOLIERELLA Spinola

Solierella canariensis Saunders

(Text-figs. 13–14)

Ten. (Saunders, 1904).

Lanz. Tahiche, 1 ♀.—Fuert. Gran Tarajal, Puerto del Rosario, iv–v, 3 ♂, 2 ♀.—G. Can. La Isleta, 2 ♂.—Ten. Adeje, Los Cristianos, iv-vii, 8 ♂, 2 ♀.—Gom. Playa Calera, 4 ♂.



Figs. 13–14. *Solierella canariensis* Saund. antenne.—13. ♂ de la f. typique.—14. ♂ de la f. *heterocera* n.

Saunders (1904) décrit un seul ♂ de cette espèce, de Tenerife, indiquant qu'il se distingue par son postscutellum et ses pattes sans taches claires, ses antenne, allongées, sa petite 2ème cellule cubitale, dont les côtés sont égaux au pétiole ; remarquons d'emblée que ce dernier caractère n'a que peu de valeur taxonomiques car la forme de cette cellule est individuellement très variable ; le pétiole peut disparaitre presque complètement et la cellule devenir correlativement plus grande.

Dans le matériel récolté par M. Guichard, je trouve des ♂ qui correspondent exactement à la description de Saunders et d'autres qui diffèrent par la couleur des pattes ou la forme des antennes. Après une longue étude, je suis arrivé à la conclusion que tous ces individus appartiennent à la même espèce, mais que la variation de la structure des antennes présentait un phénomène exceptionnel.

L'espèce est effectivement caractérisée au premier abord par l'absence de ligne blanche au postscutellum. On remarquera d'autre part que la partie supérieure des mésopleures (les " épimères ") est entièrement lisse et très brillante ; les mésopleures sont par ailleurs brillantes avec une ponctuation très nette, devenant très espacée dans leur partie tout à fait postérieure ; la ponctuation du dos du thorax est très nette aussi, fine, de densité un peu variable, mais les espaces restant plus grands que les points ; la sculpture de l'aire dorsale du propondéum est extrêmement variable, toujours assez forte, sans microréticulation ; le front, à ponctuation dense, ne montre pas les carènes en v que l'on voit chez *compedita* Picc., mais il y a souvent une ligne médiane enfoncée dans sa partie supérieure ; mandibules comme chez *compedita*, joues plus courtes.

L'extension des dessins clairs est variable. Les individus de Tenerife, Gran Canaria et Gomera ont les tubercules huméraux noirs ou ferrugineux ; chez la plupart d'entre eux, les fémurs sont entièrement noirs, les tibias 3 noirs ou avec une tache basale claire peu visible ; 2 ♂ de Tenerife montrent cependant de très petites taches blanches à l'extrémité des fémurs 1 et 2 et à la base des tibias 2 et 3. Les spécimens de Fuerteventura et Lanzarote ont une tache blanche aux tubercules huméraux, des taches bien nettes à l'extrémité des fémurs 1 et 2, à la base des tibias 3 et, plus ou moins développées, aux autres tibias. On voit que cette variation met en défaut la table des espèces que j'avais donnée (1964) puisque celle-ci, au No. 2, associait à des épimères brillants l'absence de tache blanche aux fémurs 1 et 2.

Reste le problème, évoqué ci-dessus, de la variation des antennes du ♂. Chez 13 exemplaires, des diverses îles, les antennes, de 13 articles, sont telles que les a décrites Saunders : les articles 3 à 7 relativement longs, le dernier pas plus long que le précédent (Text-fig. 13). Par contre, chez 4 des 8 ♂ de Los Cristianos (l'un a malheureusement perdu la tête au cours de manipulations), les antennes sont très différentes, avec des articles basaux plus courts et un 13ème arcticle très développé, plus long que les 3 précédents réunis (Text-fig. 14) ; je n'ai pas observé d'intermédiaires entre ces 2 types.

Le problème qui se pose naturellement est de savoir s'il y a là 2 espèces distinctes ou un dimorphisme des ♂ chez une même espèce. J'ai cherché à voir si d'autres caractères se trouvaient associés à ces types de structure antennaire et n'ai rien trouvé de bien probant ; chez les 4 ♂ à antennes spéciales la ligne médio-frontale n'est guère marquée, les pattes sont du type foncé. En faveur d'un phénomène de dimorphisme je dirai tout d'abord que les deux types de ♂ ont été récoltés le même jour dans la même station. Je dirai aussi qu'une variation tout aussi étendue de la forme des antennes existe chez *S. compedita*, mais elle est, chez cette espèce, géographique ; chez la race typique, qui habite une grande partie de la région méditerranéenne, le 13ème article des antennes du ♂ est petit ; il est plus grand chez *compedita cretica* Beaum., de Crète, très grand chez *compedita cypriaca* Beaum., de Chypre. On peut donc supposer qu'il existe chez certaines *Solierella* une instabilité génétique dans le déterminisme de la structure des antennes, pouvant amener une variation géographique (*compedita*) ou individuelle (*canariensis*). Ce sont là des suppositions, qui devraient être étayées par de nouvelles observations. Je donne le nom de f. *heterocera* aux ♂ à long arcticle terminal.

Solierella dispar Pulawski

Fuert. Corralejos, 2 ♀.

J'ai trouvé ces 2 ♀ identiques à des paratypes d'Egypte que je dois à l'obligeance de M. Pulawski.

Solierella pectinata Pulawski

G. Can. Maspalomas, 4 ♂, 2 ♀.

Cette espèce a été décrite (1964) d'après 2 ♀ d'Egypte et, grâce à l'amabilité de son auteur, j'ai pu étudier la paratype et le comparer aux ♀ de Gran Canaria. Tous les caractères importants : forme des mandibules et du clypéus, antennes, traits généraux de la sculpture, épines des tarses 1, coloration, m'ont paru semblables. Il y a de petites différences de sculpture, mais l'on ne peut y attacher grande importance puisque les 2 ♀ d'Egypte sont déjà différentes à ce point de vue.

Le ♂ inédit a des mandibules avec un lobe au bord inférieur comme la ♀ ; son clypéus, brillant et légèrement caréné dans sa partie médiane, se termine par une pointe très aiguë. Antennes de 13 articles ; le 3ème est nettement plus long que large, les suivants deviennent progressivement plus courts, le 8ème à peu près aussi long que large, le 12ème très court ; le 13ème article est très développé, aussi long que les 4 précédents réunis, aplati, probablement post mortem. Sculpture comme chez la ♀ ; le métatarse 3 avec la dilatation habituelle. Coloration comme la ♀.

Pulawski fait justement remarquer que cette espèce est proche de *mandibularis* de Beaumont, décrit d'après un ♂ du Maroc. Ce dernier, cependant a une sculpture plus fine et beaucoup plus dense sur les diverses parties du corps ; ce fait est particulièrement évident sur les mésopleures qui sont entièrement mates et sur les faces latérales du propodéum, mates aussi en raison de la densité de la striation. De plus, *mandibularis* ♂ a les premiers articles des antennes très courts et le 13ème très petit. Il est possible cependant que la structure des antennes soit variable, comme chez d'autres espèces.

NITELA Latreille

Nitela spp.

Ten. (Bischoff, 1937, *spinolai* Latr.).

Lanz. Tahiche, 1 ♀.—Fuert. Gran Tarajal, 1 ♂, 1 ♀.—G. Can. El Palmital, 1 ♂.—Gom. Above Agulo, 2 ♂.—Hierro. Frontera, 1 ♂.—Palma. Los Tilos, 1 ♀.

Ces quelques spécimens m'ont placé en face d'un problème difficile et même impossible à résoudre avec un matériel si restreint. Ils appartiennent à diverses formes. Les plus caractérisés sont les 2 ♂ de Gomera qui présentent au milieu du bord antérieur du clypéus un appendice assez allongé, à bords parallèles, tronqué à l'extrémité ; chez le ♂ de *spinolae* Latreille, d'Europe, il n'y a à cet endroit qu'une saillie triangulaire formant l'extrémité d'une carène médiane ; chez la ♀ de *spinolae*, cette saillie médiane est encore moins apparente. Les spécimens des 2 sexes, provenant des autres îles, ont une légère échancrure au milieu du bord antérieur du clypéus et c'est à ce type qu'appartient l'individu signalé de Tenerife par Bischoff sous le nom de *spinolae*. Il semble donc qu'il y ait 2 espèces, mais diverses difficultés surgissent : la forme de l'échancrure médiane du clypéus est variable ; d'autre part, la sculpture l'est aussi, sans liaison avec les autres caractères. De nouvelles études s'imposent, basées sur de nombreux exemplaires.

TRYPOXYLON Latreille

Trypoxylon attenuatum Smith

G. Can. Maspalomas, 1 ♀.

PSEN Latreille

Psen (Mimesa) sublaevis de Beaumont

G. Can. (de Beaumont, 1954).

G. Can. La Isleta, Maspalomas, 10 ♀.

J'ai décrit tout d'abord (1954*a*) cette espèce d'après 1 seul ♂ de Gran Canaria ; plus tard (1956) les récoltes de M. Guichard au Fezzan et au Tibesti m'avaient permis de donner une diagnose plus complète basée sur 6 ♂ et 5 ♀, en indiquant qu'il serait utile de pouvoir examiner une ♀ des Canaries. C'est maintenant chose faite et j'ai pu constater l'identité des individus récoltés dans ces 2 régions si éloignées.

DIODONTUS Curtis

Diodontus oraniensis (Lepeletier)

Ten. (Saunders, 1904, *gracilipes* Saund.) ; G. Can., Ten., Gom. (de Beaumont, 1954).

Fuert. Puerto del Rosario, 3 ♀.—G. Can. Maspalomas, 1 ♂, 1 ♀.—Ten. Los Cristianos, 22 ♂, 9 ♀.

Diodontus freyi Bischoff

(Text-fig. 15)

G. Can. (Bischoff, 1937).

G. Can. Cruz de Tejeda, Maspalomas, v–vi, 4 ♀.—Ten. Las Cañadas, La Esperanza, Los Cristianos, 8 ♂, 13 ♀.

Le ♂ type de cette espèce, provenant de Gran Canaria, conservé au Musée zoologique d'Helsinki, a été aimablement mis à ma disposition et j'ai ainsi pu constater l'identité des ♂ récoltés à Tenerife. En complément de la description originale, je dirai que les antennes (le funicule entièrement ferrugineux en dessous) sont relativement courtes et épaisses, le 3ème article aussi long que large à l'extrémité, les articles suivants un peu plus longs que larges (Text-fig. 15) ; le métatarse 2 n'est pratiquement pas courbé, tandis que le métatarse 1 l'est visiblement (quoique moins que chez *minutus* F. ou même que *friesei* Kohl) ; la tête, le thorax et les 2 premiers tergites sont très brillants, sans sculpture alutacée ; la face dorsale du propodéum présente une assez grande zone, élargie sur les côtés, lisse et brillante. Le seul spécimen capturé au mois d'avril est de plus petite taille et montre une ponctuation plus dense sur le mésonotum.

Chez la ♀, la distance qui sépare les pointes latérales du clypéus est plus courte que celle qui sépare une de ces pointes de l'oeil voisin. Comme chez le ♂, le dessus de la tête, le dos du thorax et les 2 premiers tergites sont très brillants, pratiquement sans sculpture alutacée ; sur le mésonotum, il n'y a que des points très épars ; la partie postérieure et inférieure des mésopleures est billante, à peine sculptée ; la face dorsale du propodéum montre une zone lisse et brillante, généralement plus développée que chez le ♂.

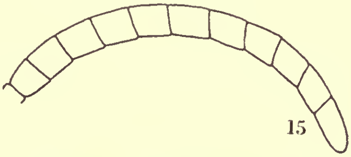


FIG. 15. *Diodontus freyi* Bischoff. ♂ ; antenne.

Les ♂ de Tenerife sont colorés comme le type de Gran Canaria. Les ♀ des 2 îles sont par contre différentes. Chez celles de Gran Canaria, les mandibules sont ferrugineuses, le bord postérieur des tubercules huméraux blanchâtre, les tibias 1 jaunes en avant, les tibias 2 jaunes à la base, les tibias 3 à peine éclaircis à la base, les tarses 1 et 2 plus ou moins ferrugineux. Les ♀ de Tenerife sont plus claires ; sont d'un jaune un peu ferrugineux : les mandibules (sauf leur pointe), une petite tache à l'extrémité de tous les fémurs, les tibias (un peu obscurcis en arrière) et les tarses 1 et 2, la base des tibias (le reste plus ou moins ferrugineux) et tarses 3 ; tubercules huméraux tachés de blanc.

Cette espèce me semble avoir de grands rapports avec *crassicornis* Gribodo.

Diodontus sp.

Fuert. (de Beaumont, 1954).

Fuert. Puerto del Rosario, iv–v, 1 ♂, 8 ♀.

L'étude complète des *Diodontus* des Canaries ne serait vraiment fructueuse qu'en relation avec celle des espèces habitant le nord de l'Afrique. Or, dans ce domaine, nos connaissances sont encore très fragmentaires. C'est pourquoi je ne donnerai sur ces individus de Fuerteventura que de brèves indications. Par la structure de ses antennes et de ses métatarses, le ♂ est proche de *freyi*, mais sa sculpture est plus forte, la ponctuation de son mésonotum plus dense, la tête et les 2 premiers tergites sont alutacés, le propodéum sans zone lisse ; les ♀, également, ont une sculpture plus forte que celle de *freyi*.

SPILOMENA Shuckard

Spilomena canariensis Bischoff

Ten. (Bischoff, 1937).

Hierro. Frontera, 1 ♂, 3 ♀.

Espèce décrite (1937) d'après un seul couple. Blüthgen (1953), dans sa révision du genre, donne d'utiles compléments sur l'allotype ♂ qu'il a examiné. Les ocelles postérieurs très rapprochés, les téguments brillants de la tête et du thorax, les antennes et les pattes très claires permettent de reconnaitre cette espèce.

AMMOPLANUS Giraud

Ammoplanus spp.

Fuert. (de Beaumont, 1954).

Fuert. Puerto del Rosario, 1 ♀.

On sait que chez les *Ammoplanus*, certains organes varient beaucoup avec la taille et que les ♀ présentent moins de caractéristiques spécifiques que les ♂. Dans ces conditions l'identification de ♀ isolées reste problématique. La ♀ récoltée par M. Guichard à Fuerteventura est semblable à l'une de celles que j'avais signalées de cette île (Chilegua) ; il s'agit d'une espèce voisine de *maidli* Gussakovskij, avec un stigma bicolore et la pointe médiane du clypéus aiguë, mais les tubercules huméraux sont noirs. L'autre ♀ que le Dr. Lindberg avait capturée à Fuerteventura a le stigma entièrement clair et la pointe médiane du clypéus n'est pas aiguë.

ECTEMNIUS Dahlbom

Ectemnius* (*Hypocrabro*) *continuus rufipes (Brullé)

Canaries (Brullé, 1840, *Crabro rufipes* Br.).

Ten. Las Mercedes, 2 ♂.—Gom. above Agulo, 8 ♂. Capturés au vol sur des buissons de *Salix* poussant le long d'une rivière, au dessus d'Agulo.

Cette forme, d'aspect bien caractéristique (corps entièrement noir, ailes fortement enfumées, scapes et une grande partie des pattes ferrugineux) a été décrite comme espèce distincte par Brullé sous le nom de *Crabro* (*Solenius*) *rufipes*. Dalla Torre (1897), ayant placé *Ceratocolus rufipes* Lep. Br. 1834 (espèce américaine) et *Crabro* (*Solenius*) *rufipes* Br. 1840 dans le genre *Crabro*, a renommé le deuxième *rufitarsis* D.T. Ma is il s'agit d'un cas d'homonymie secondaire et transitoire, puisque ces 2 espèces sont placées maintenant dans les genres *Lestica* et *Ectemnius* ; la forme des Canarie speut donc garder le nom qui lui a été donné par Brullé.

Cette forme n'avait pas été retrouvée depuis sa description et Kohl ne la connaissait pas ; les individus récoltés par M. Guichard s'y rattachent sans doute. J'ai comparé cette série de ♂ à des *continuus* F. de la côte atlantique du Maroc et je les ai trouvés morphologiquement presque identiques ; la forme du clypéus, des antennes et des pattes, en particulier est tout à fait semblable ; il y a de très légères différences de sculpture, mais comme celle-ci varie, soit chez les individus marocains, soit chez les individus canariens, on ne peut attribuer d'importance à ce caractère. J'admets donc que *rufipes* Br. est une sous-espèce insulaire et mélanique de *continuus* F.

CROSSOCERUS Lepeletier et Brullé

Crossocerus (s.s.) ***lindbergi*** de Beaumont

Ten. (de Beaumont, 1954).

DASYPROCTUS Lepeletier et Brullé

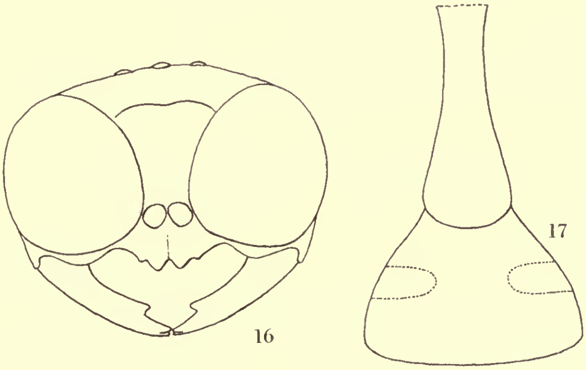
Dasyproctus fortunatus sp. n.

(Text-figs. 16–17)

Holotype ♀. Tenerife, Cumbre de Aguine, 26.iv.59, *J. M. Fernandez* leg., coll. Verhoeff.

♀. 8 mm. Corps noir mat, un peu plus brillant sur les mésopleures que chez *arabs* Kohl ou *ceylonicus* Saussure ; sont jaunes : les 2/3 basaux des mandibules, les scapes, une tache à la face inférieure du 2ème article des antennes, une bande, interrompue au milieu, sur le collare, les tubercules huméraux, 2 grandes taches, se touchant presque au milieu, sur la partie centrale du scutellum, les axilles scutellaires, 2 taches au 2ème tergite, 2 taches à la base du 4ème, une bande à la base du 5ème, une petite tache à l'apex des fémurs 1 et 2, les tibias 1 et 2 (tachés de noir en arrière), une bande sur la face postérieure des tibias 3, s'élargissant dans leur moitié apicale sur la face externe, mais sans atteindre l'extrémité ; tarses ferrugineux sombre. Pilosité relativement peu développée, argentée, dense et couchée sur le clypéus.

Mandibules avec une dent antéapicale bien nette au bord supérieur ; clypéus caréné, son bord antérieur avec 2 dents médianes bien nettes, accompagnées de chaque côté d'une dent plus petite, peu visible sous la pilosité (Text-fig. 16) ; 3ème article des antennes un peu plus, le 4ème un peu moins de 2 fois aussi long que large, les articles suivants progressivement plus courts ; sillon scapal fermé en haut par une très forte carène en arc surbaissé ; face supérieure de la tête à ponctuation extrêmement nette, dense en avant des ocelles où les espaces sont plus petits que les points, plus espacée en arrière des ocelles où les espaces sont plus grands que les points ; impressions orbitaires brillantes, peu développées, plus petites qu'un ocelle ; POL : OOL = 5 : 6 ; tempes à ponctuation un peu plus espacée que la zone postocellaire. Collare de forme normale, sa carène antérieure se recourbant en arrière vers les tubercules huméraux ; mésonotum avec une ponctuation plus superficielle et plus fine que sur la tête, dense sur les côtés, devenant plus espacée au milieu ; scutellum ponctué comme le milieu du mésonotum ; de courtes carènes longitudinales dans la partie tout à fait postérieure du mésonotum et du scutellum ; sur les mésopleures, les points, peu nettement enfoncés, sont séparés par des espaces plusieurs fois plus grands qu'eux mêmes. Face dorsale du propodéum striée-réticulée, l'aire dorsale limitée par un sillon ; faces latérales très finement et densément striées. Premier segment abdominal élancé, 2·7 fois aussi long que sa largeur maximum en arrière, avec une ponctuation très espacée peu visible (Text-fig. 17).



FIGS. 16–17. *Dasyproctus fortunatus* sp. n. ♀.—16. Tête de face.—17. Base de l'abdomen.

L'on ne connaissait jusqu'à présent qu'une espèce de *Dasyproctus* en Afrique au nord du Sahara : *arabs* Kohl ; la nouvelle espèce s'en distingue très facilement par la ponctuation de la tête et du thorax, la distribution des dessins jaunes, en particulier sur l'abdomen. *D. fortunatus* fait partie de la lignée 2 de Leclercq (1958) et, en suivant la table de cet auteur, on est amené à *ceylonicus* Sauss. de la région orientale. Comparée au type de cette dernière, la ♀ des Canaries s'est révélée assez semblable, mais se distingue par une taille un peu plus grande, l'échancrure médiane du clypéus moins profonde, la ponctuation plus nette de la tête et surtout du thorax, la couleur jaune un peu plus étendue.

LINDENIUS Lepeletier et Brullé

Lindenius hamilcar Kohl

Canaries (Kohl, 1915).

Kohl, dans sa monographie, signale cette espèce des Canaries. J'ai pu examiner le spécimen sur lequel est basé cette citation. Il s'agit d'une ♀ de Fuerteventura, identique aux individus que je possède, provenant de Tripolitaine.

OXYBELUS Latreille

Oxybelus mucronatus moricei de Beaumont

Fuert. Betancuria, 2 ♂.

Il s'agit de la sous-espèce nord-africaine de *mucronatus* Fabricius (*pugnax* Olivier), décrite en 1950. Ces 2 ♂ de Fuerteventura sont semblables à ceux du continent.

Oxybelus fischeri Spinola

On peut distinguer deux sous-espèces.

Oxybelus fischeri fischeri Spinola

Fuert. Gran Tarajal, Puerto del Rosario, 4 ♂, 2 ♀.

Les individus provenant de Fuerteventura sont très semblables à ceux du Maroc et peuvent être rattachés à la race typique de l'Afrique du nord.

Oxybelus fischeri tegularis Saunders

Ten. (Saunders, 1903, Bischoff, 1937, *O. tegularis* Saund.) ; G. Can., Ten., Gom. (de Beaumont, 1954).

G. Can. Cruz de Tejeda, La Isleta, 2 ♂, 1 ♀.—Ten. Las Cañadas, Parador de Teide, Puerto de la Cruz, Above San Andrés, 21 ♂, 2 ♀.

J'ai indiqué précédemment (1954*a*) que les *Oxybelus* de Tenerife, Gran Canaria et Gomera, décrits par Saunders sous le nom de *tegularis* pouvaient être considérés comme une sous-espèce de *fischeri* Spin., se distinguant par la plus faible extension des dessins clairs et par la ponctuation plus fine des tergites. Ces nouveaux spécimens de Tenerife et Gran Canaria confirment ce point de vue ; je note cependant que les ♂ ont souvent de petites taches jaunes au scutellum et parfois aussi de petites taches au collare.

Oxybelus cocacolai Verhoeff

Lanz. Arrecife, 1 ♂.—Fuert. Coti, Puerto del Rosario, iv–v, 4 ♂, 17 ♀. Trouvé seulement dans les dunes côtières.

Espèce tout récemment décrite (1968) sur la base d'individus récoltés à Agadir. Les spécimens canariens sont un peu différents ; la pilosité argentée est encore plus développée ; la ponctuation est un peu plus dense ; la coloration claire est plus étendue : le scutellum et la face dorsale de l'abdomen sont entièrement blanc jaunâtre.

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A REVISION OF THE ETHIOPIAN SPECIES OF THE TRIBE NOTIPHILINI (DIPTERA : EPHYDRIDAE)

B. H. COGAN

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BY

B. H. COGAN x-ref

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By B. H. COGAN

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SYNOPSIS

A revision of the Ethiopian species of the tribe Notiphilini is attempted. The diagnostic characters of the tribe are re-defined to enable the following genera to be included: *Notiphila* Fallén, *Paralimna* Loew, *Oedenops* Becker, *Karema* Cresson, and *Dryxo* Robineau-Desvoidy. Two subgenera, *Afrolimna* and *Oedenopiforma*, and twenty-six species are described as new. Lectotypes and paralectotypes are designated for *Notiphila ignobilis* Loew, and *Notiphila obscuricornis* Loew. *Paralimna pokuma* Cresson, *Paralimna mackieae* Cresson and *Paralimna adversa* Cresson, are re-instated as valid species. Particular emphasis has been placed on the structure of the male genitalia as a means of establishing species, and inter-generic relationships.

INTRODUCTION

Since the publication by Cresson (1947) of his revision of the Ethiopian Notiphilini, numerous additional species have been described by Wirth (1955, 1956, 1960) and Soika (1956*a*, 1956*b*). Much additional material has been collected, or made available for study, and a combination of these factors will eventually necessitate a complete revision of the family in this region. It is to this end that I have attempted a revision of the tribe Notiphilini. This tribe, although consisting of only five genera, now contains a majority of the described Ethiopian Ephydrids.

Earlier work on Ethiopian Notiphilini was carried out by Loew (1862), Adams (1905), Bezzi (1908), and Becker (1903, 1923), all of whom described species in the genera under consideration in this paper, but as part of composite works on large collections of Ethiopian or North African Acalypterates.

The first Ephydrid specialist to work in a revisionary manner on material from the Ethiopian region, as here delimited, was Cresson, who over a number of years, published numerous papers concerned partly or wholly with the Notiphilinae and culminating in his aforementioned work, which was also unfortunately his last. In his 1947 paper Cresson established the generic limits of the tribe in Africa, but included only three genera, *Oedenops*, *Paralimna* and *Notiphila*. In this paper I have included two further genera, *Karema* and *Dryxo*, on the systematic position of which Cresson failed to pass an opinion, apart from suggesting the former as a link between *Paralimna* and *Dryxo* (1929).

In recent years Wirth (1955, 1956, 1960) has published further descriptions of new species and records of distribution in Southern and Eastern regions of Africa. Soika (1956*a*) described additional species from the Congo, suggested much synonymy, and keyed those species with which he was familiar. Soika (1956*b*, see Wirth 1960 : 391) briefly described further species from the Congo and the Malagasy sub-region.

For the purpose of this paper I have defined the Ethiopian region as including the mainland of Africa south of the Sahara, the Southern Arabian peninsula, the Malagasy sub-region and the Seychelles and associated islands. Those Palaearctic species recorded from the Sudan have been omitted.

The original material upon which this work has been carried out consisted of the large unidentified collections of the British Museum (Natural History) and many hundreds of specimens from the Belgian Congo, Madagascar, South, and West Africa.

Unless otherwise stated all the specimens are in the B.M.(N.H.). However, Congolese specimens are from the M.R.A.C. and the material collected by Dr. F. Keiser and Mr. B. R. Stuckenberg has been returned to N.M.B. and N.M. respectively.

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To Dr. W. W. Wirth, United States National Museum (U.S.N.M.), I am most grateful both for his advice and for arranging for me to study material from the U.S.N.M., including collections sent to him by various collectors.

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BIOLOGY AND ECOLOGY

To the present time there has been no published record of work upon the ecology or life histories of any of the five genera, from the Ethiopian region. Mr. B. R. Stuckenberg informs me (personal communication) and his observations are borne out by the limited information imparted by specimen data labels, that the adults of *Notiphila* are found on waterside vegetation, while those of *Paralimna* are mud dwellers. *Oedenops* appears to be restricted to vegetation bordering the littoral regions.

The elongated alimentary tracts of *Paralimna* and *Notiphila* are invariably full of microscopic sand and organic particles suggesting that, in the adults, feeding is confined to ' grazing ' upon algae etc. on damp surfaces. Members of the genus *Notiphila* are often swept from growing rice but there appears to be no evidence to suggest that they are injurious to rice in this region.

GENERIC RELATIONSHIPS

Of the five genera so far designated as belonging to this tribe, three, *Paralimna*, *Oedenops* and *Notiphila*, are easily placed here, unlike *Dryxo* and *Karema* which are associated on less obvious grounds. Similarity of form, with due regard to the reduced condition of the mesonotal setae, in *Karema* suggests a close relationship with *Paralimna*.

The members of the *Paralimna albonotata* species group have, more noticeably so in many oriental forms, considerable extension of the frons and facial region in the manner of *Karema* (Text-figs. 10, 39). Superficially, in colour and general habitus, *Karema* species resemble those of the new subgenus *Afrolimna* sgen. n. of *Paralimna*. The male genitalia are complex (Text-fig. 91) and the complex form of the hypandrium is unique in this tribe. The external claspers are attached to the epandrium and to sclerotized areas of the epandrial (paraproctal) membrane. The male genitalia are of little use in determining the relationship of this genus although basically of the Notiphiline type. Cresson (1929) considered this genus to be a connectant between *Paralimna* and *Dryxo*.

The placing of *Dryxo* in this tribe is far more a matter of conjecture, and in fact Cresson, apart from designating *Dryxo* as a member of the subfamily Notiphilinae, never commented upon the position of this genus. I consider it to be a highly specialized relative of this tribe, possibly requiring the erection of a separate tribe due to a number of distinctive characters, e.g. almost total absence of strong bristles on the head, flat projecting frons, only one centrally positioned notopleural bristle, and a series of long weak bristles on the basal ventral surface of the first long vein of the wing. An extrapolation of the condition found in *Karema* may explain all but the last of the characters mentioned.

The male genitalia of *Dryxo* are the strongest evidence for the inclusion of this genus in the tribe Notiphilini.

The external claspers in *D. ornata* are broad and rounded, not angular as in the subgenus *Paralimna* but bearing considerable resemblance to those of the subgenus *Afrolimna* sgen. n. *D. woodi* however, possesses more elongate external claspers fused to a sclerotized region on the ventral edge of the paraproctal membrane, a condition similar to that found in *Karema*.

The genera *Paralimna* and *Oedenops* are very closely related and the subgenus *Oedenopiforma* subgen. n. of *Paralimna* provides the perfect connecting link. The only character in the species of the Ethiopian region which divides these two genera is the absence of sternopleural bristles in *Oedenops*. *Notiphila*, while without doubt a member of the tribe Notiphilini, is not as closely related to *Paralimna* as is *Oedenops*. It differs in frontal bristle arrangement and shortening of the costa, the latter extending only to the third long vein instead of the fourth. Cresson (1922) considered *Paralimna* more closely related, via the subgenus *Phaiosterna*, to the non-Ethiopian genus *Dichaeta*.

MALE GENITALIA

The male genitalia are consistent in basic structure between all five genera, differing only in degree of development of the component parts. The genus *Notiphila* possesses seemingly the most evolved and simple condition and the genus *Dryxo* the most structurally complex.

The individual condition in each genus will be described in the introduction to that genus.

The basic structure (Text-figs. 8, 9) consists of a strongly sclerotized epandrium partially or completely enclosing the paraproctal plates, proctigers or cerci, and the paraproctal membrane. The external claspers are attached to the ventral aspect of the epandrium and appear to differ in degree of development within a genus according to the size of the insects.

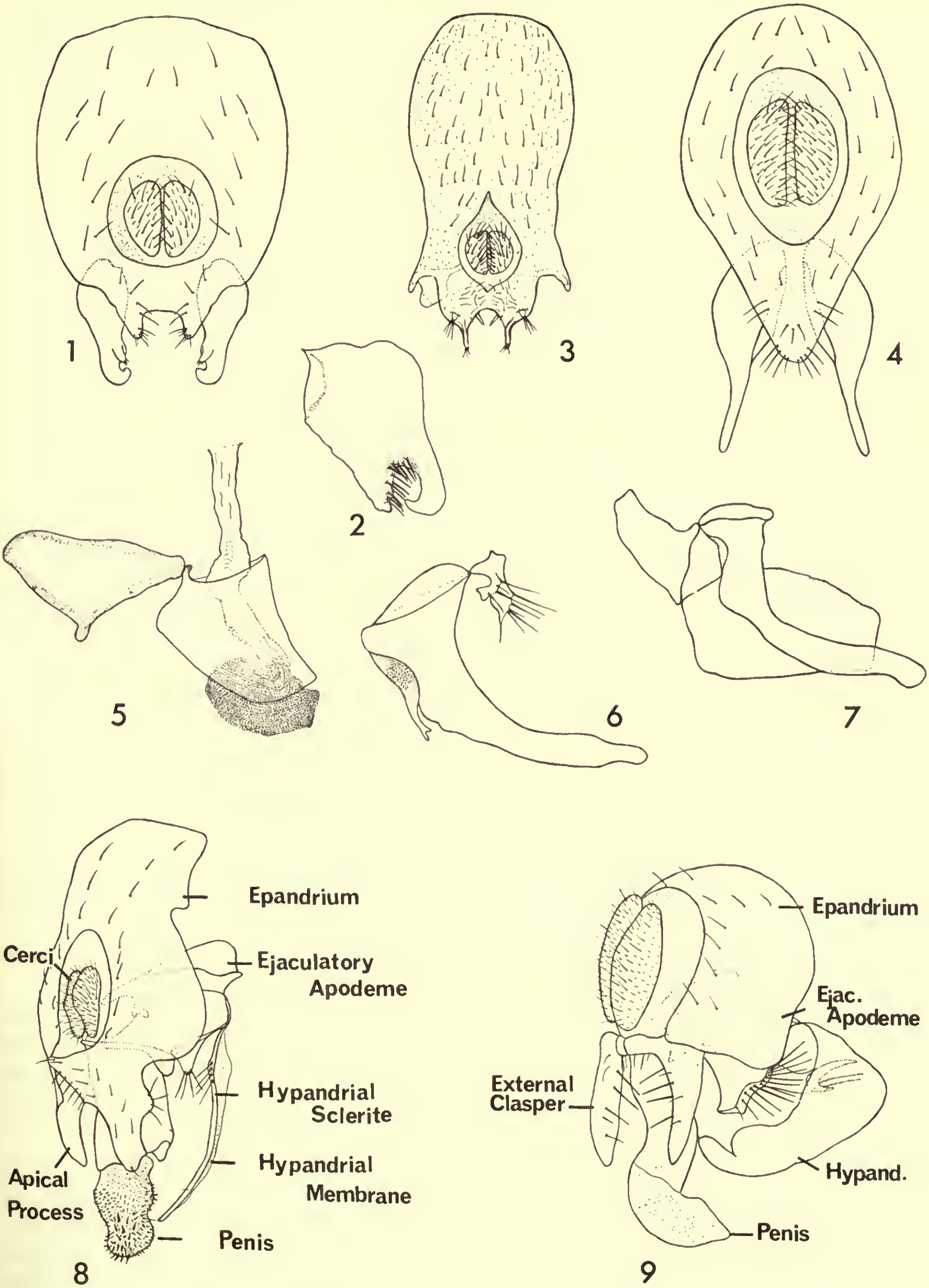
The hypandrium in all but *Karema* is a simple conical or sacklike structure usually only partially sclerotized, and in the latter condition supported by sclerotized rods. It is connected to the epandrium via the ejaculatory apodeme and to the aedeagus either directly to the phallobase or via the lateral parameres. The aedeagus consists of a sclerotized phallobase, a membranous, invariably extensible, penis, which may be armed with spinules, and lateral parameres or internal claspers which may be fused at their bases or free.

Accessory structures, differing appreciably in complexity between genera, are present and aid in holding the aedeagus free from the hypandrium and ensuring its rigid ejaculation.

The study of the male genitalia of all the Ethiopian species in the tribe Notiphilini, known from the male sex, has shown them to be consistent, if difficult, structures for the separation of species, providing that adequate critical observation is made upon all the parts of the genitalia.

COLOUR

Colour, in the members of the genera under consideration, is almost without exception due to the presence of a layer of ‘ pollen ’ or dust, of varying density, overlying the ground colour of the insect cuticle, the latter invariably black. Due to the variety of colours visible on slight alteration of the angle of the insect to the light source, the colours quoted are combinations representing the predominant


1
2
3
4
5
6
7
Epandrium
Cerci
Ejaculatory Apodeme
Hypandrial Sclerite
Hypandrial Membrane
Apical Process
Penis
8
Epandrium
Ejac. Apodeme
External Clasper
Hypand.
Penis
9

FIGS. 1–9. 1, 2, *Notiphila bipunctata* Loew, 1, epandrium; 2, external claspers; 3, *N. cana* Cresson, epandrium; 4, *N. lineata* Soika, epandrium; 5, 6, *N. bipunctata* Loew, 5, ejaculatory apodeme and aedeagus; 6, internal claspers, and hypandrial sclerite; 7, *N. lineata*, internal genitalia; 8, *N. pseudodimidiaticornis* Soika, ventrolateral view of ♂ genitalia; 9, *Paralimna arabica nubifer* Cresson, ventrolateral view of ♂ genitalia.

impressions obtained when the insect is observed at 90° to the surface. The use of the terms pale and dark are preferred in many instances, to more precise determinations, especially with reference to antennae and limbs, where strength of light source or degree of dusting may produce an infinite number of colour combinations.

The Tribe **NOTIPHILINI** (after Cresson)

Small to large flies, eyes bare, lunule not developed above the region of antennal insertion. The ocellar bristles larger than the posterior ocellars, both may be absent in *Dryxo* R.D. Postnotopleural, when present, situated at ventral margin and weaker than anterior notopleural. Humeral and supra-alar bristles present. Mid tibiae with one to four usually erect dorsal spines, weak in *Oedinops*.

KEY TO ETHIOPIAN GENERA OF THE TRIBE NOTIPHILINI

1	Two notopleural bristles, dorsocentral bristles present	2
–	One notopleural bristle, medially placed, *dc* absent	4
2	Pre-sutural bristle and mesonotal setulae present	3
–	Pre-sutural bristle usually absent, mesonotal setulae lacking	***OEDENOPS*** Becker p. 354
3	Costa extending to third long vein	***NOTIPHILA*** Fallén pp. 286, 287
–	Costa extending to fourth long vein	***PARALIMNA*** Loew pp. 314, 324
4	Frontal and ocellar bristles strong	***KAREMA*** Cresson p. 356
–	Frontal and ocellar bristles weak or lacking	***DRYXO*** R.D. p. 358

NOTIPHILA Fallén

Notiphila Fallén, 1813 : 22.

This genus contains, at present, twenty-three species from the Ethiopian region, including four endemic to the Malagasy sub-region. In comparison with the Palaearctic and Nearctic faunas this genus is poorly represented.

The twenty-three species in this genus are morphologically extremely similar. This fact, together with the variability of colouring, makes specific determination difficult, without recourse to genitalic differences.

The male genitalia, however, provide reliable characters for differentiating between even closely related species.

The genus *Notiphila* may be distinguished from the other members of the tribe Notiphilini by the following combination of characters: Costa extending only to the third long vein, sternopleuron with one large bristle, middle tibia with a dorsal row of at least three erect spinelike bristles. Notopleuron with two bristles, both situated close to the ventral edge, the anterior member slightly the stronger.

The male genitalia differ quite markedly between the two subgenera. That of the subgenus *Notiphila* (Text-fig. 8) has greatly reduced external claspers, which are fused almost completely to the ventral edge of the epandrium, acting as supports for the ventral extensions of the epandrium. The latter structures probably function as claspers. The internal claspers are reduced but the membranous penis is usually armed in some way with spinules.

The male genitalia of the subgenus *Agrolimna* Cresson (Text-figs. 4, 7) possesses well developed and free external claspers, well developed internal claspers, and an unarmed penis. The hypandrium is virtually without sclerotized supports.

There is considerably more variation in the structure of the genitalia in the subgenus *Notiphila* than in the subgenus *Agrolimna*.

Subgenus ***NOTIPHILA*** Fallén

Type-species, *N. cinerea* Fallén, 1810 (Westwood, 1840 : 153).

Restricted by Cresson (1917) and containing those species possessing the following combination of characters:

Facial series of bristles few in number, strong, and usually inserted ventral to the lower level of the eye (Text-fig. 13). Middle tibia with three dorsal, erect spines. Hind metatarsus with black basal scopa. Male mid femur with a comb of short curved setae on the ventral face. Male genitalia with external claspers fused to the ventral edge of the epandrium.

Containing the majority and most specifically distinct of *Notiphila* species, the male genitalia exhibiting considerable variation in epandrial form. Facial bristle number and arrangement, together with variety of colour, length and arrangement of hind basal scopa and flexor comb are invaluable diagnostic characters for specific differentiation.

One of the species, that I have placed in this subgenus, *N.* (*N*). *irrorata* sp. n. bears close resemblance to an oriental species, *N. dorsopunctata* Wied., the latter species being assigned to a distinct subgenus, *Notiphilacantha* Hendel, by Cresson (1948 : 16). Study of the male genitalia of *N. dorsopunctata* Wied., shows no outstanding differentiating characters which warrant the use of the subgenus *Notiphilacantha* for species from this region.

KEY TO THE ETHIOPIAN SPECIES OF *NOTIPHILA*

1 Hind metatarsal basal scopa consisting of yellow or pale brown setae, mid tibiae with four dorsal erect bristles; facial series reduced and hairlike. Mid femora of male without a ventral ' comb ' . . sgen. ***AGROLIMNA*** Cresson (p. 305) 15

– Hind metatarsal scopa of black setae, mid tibiae with three dorsal erect bristles; facial series usually of strong bristles. Mid femora of male with a ventral comb of short closely inserted setae . . . . . sgen. ***NOTIPHILA*** Fallén 2

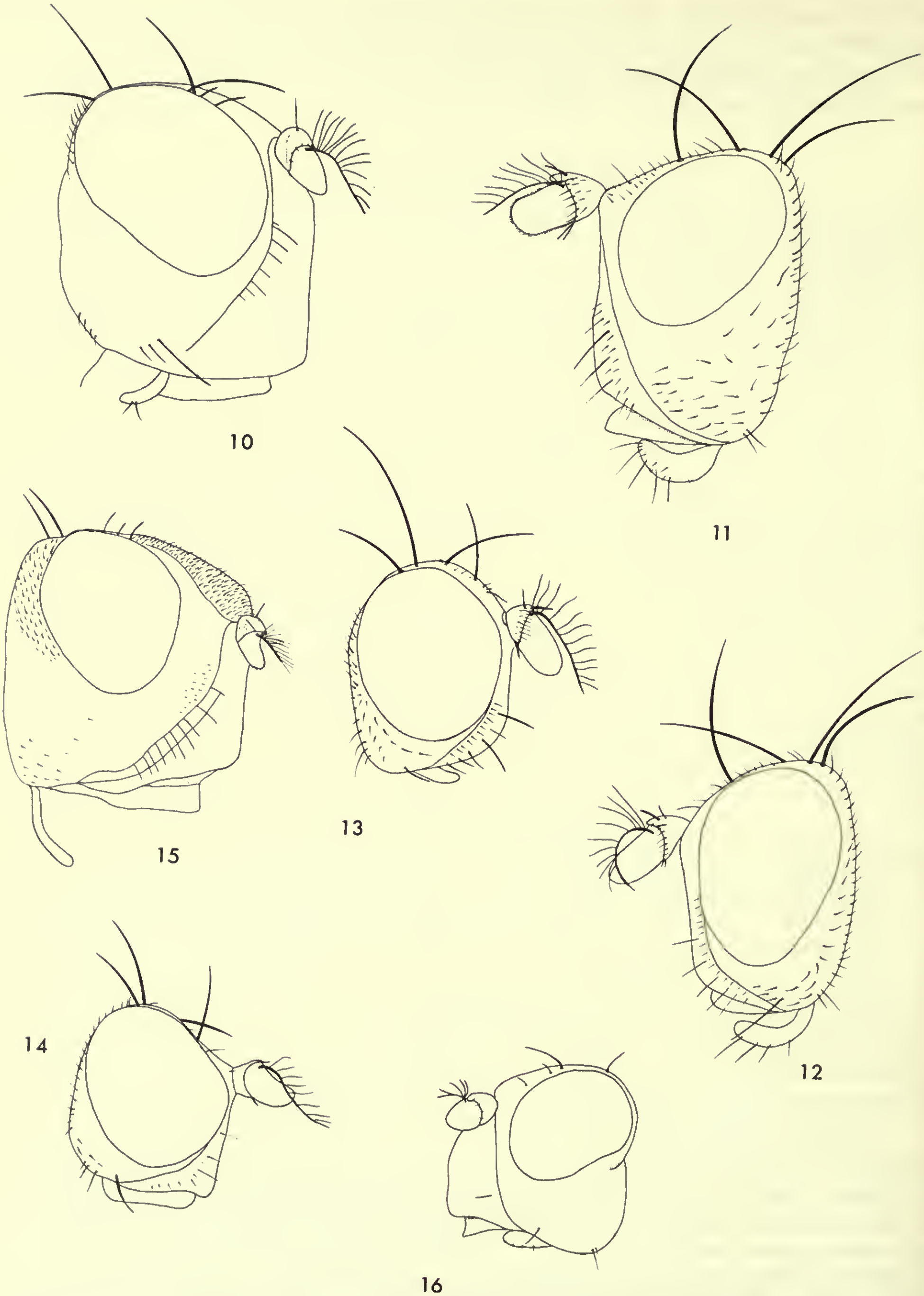
2 Hind metatarsus with a brush of dense yellow to golden brown hairs along at least part of the posteroventral face of segment 5

– Hind metatarsus with black hairs or small bristles along complete posteroventral face of segment 3

3 Bristles of facial series weaker than frontal bristles, widely separated, two in number, ventrally inserted on face; male epandrium (Text-fig. 25) with elongate narrow projections. Antennae black . . . . . . ***lunicornis*** Soika (p. 301)

– Bristles of facial series usually as strong as, or only slightly weaker than frontal bristles, three in number, more closely set, almost meeting in median line. Male epandrium (Text-figs. 18, 23) with ventral projections as broad as long. Antennae predominantly pale 4

4 Bristles of facial series strong, porrect. Face yellow in colour. Thorax generally cinereous, often totally so. Abdominal brown fasciae usually in two median broad vittae with only partial lateral extension on to anterior half of the segments. Male aedeagus with distinct strong black spines . . ***ignobilis*** Loew (p. 303)



Figs. 10–16. Heads of: 10, *Karema flavipes* sp. n.; 11 *Notiphila omercooperi* sp. n.; 12, *N. kenyaensis* Cresson; 13, *N. stuckenbergi* sp. n.; 14, *N. bivittata* sp. n.; 15, *Dryxo margaretae* sp. n.; 16, *Oedenops aurantiacus* Soika.

– Bristles of facial series slightly weaker than frontals, less porrect. Face greyish yellow in colour, antennae dark with pale base to segment III. Brown fasciae of abdomen extending over majority of segments. Male aedeagus without strong black spines . . . . **lyalli** sp. n. (p. 297)

5 Bristles of facial series as strong, or almost as strong, as the equivalent length of tips of the frontal bristles 6

– Bristles of facial series weak, appreciably weaker than frontals 10

6 Hind metatarsal brush yellow along complete length of segment. Fore femur without a series of outstanding bristles on the posteroventral face. Face silver-white **cana** Cresson (p. 292)

– Hind metatarsal brush dark along at least part of the length, thorax and abdomen never predominantly cinereous. Fore femora with a posteroventral series of bristles 7

7 Posteroventral series of fore femoral bristles as strong as facials. Face yellow with or without central carina darkened, a large species . . **pokuma** Cresson (p. 294)

– Posteroventral series of fore femoral bristles not as strong as facials . . . 8

8 Thorax cinereous, mesonotal setae arising from brown markings. Male epandrium with two additional ventral projections . . . . **irrorata** sp. n. (p. 292)

– Thorax predominantly brown, setae may or may not arise from irrorations . . 9

9 Antennae totally reddish brown or with at the most the apical third of segment III darkened, face and frons a uniform dark golden brown, facial series set ventrally on face the most dorsal arising just below the lower level of the eye. Wings infumated . . . . **fuscofacies** sp. n. (p. 296)

– Antennae totally dark or with base of antennal segment III pale. Face golden yellow, facial series set slightly above lower level of the eye and with supernumary bristle-like hairs around facial series . . . . **frigidicola** sp. n. (p. 295)

10 Face almost vertical, epistoma either retracted or in same line as lower face. Eyes small, width of buccae equal at narrowest point, at least to half height of eye (Text-fig. 11) 11

— Face more concave, epistoma posterior to line of lower face, latter often curved laterally at ventral rim. Eyes large in relation to size of head, width of buccae much less than half height of eye (Text-fig. 13) 14

11 Hind metatarsus with dense pale golden yellow hair along complete posteroventral or inner face of segment, although anterior or outer face may be darkened along all or part of its length. Face golden yellow 12

— Hind metatarsus with dense pale yellow hair along only part, usually basal third, of inner face; face grey 13

12 Eyes longer along horizontal axis, antennae totally dark, and occipital region with two grey patches which extend on to the vertex on either side of the ocellar triangle **omercooperi** sp. n. (p. 299)

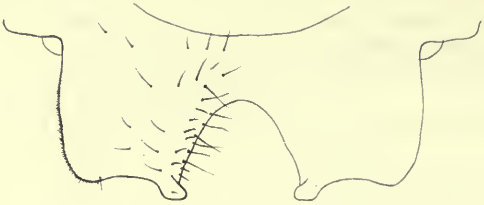
— Eyes longest along vertical axis, occipital region without the grey patches **pseudobscuricornis** Soika (p. 302)

13 Hind metatarsal basal scopa consisting of two or three very short bristles, shorter than width of segment. Facial series long, extending over half height of face **microscopa** sp. n. (p. 298)

— Hind metatarsal basal scopa consisting of three bristles at least twice as long as width of segment. Facial series short, of two to three bristles **pseudodimidiaticornis** Soika (p. 301)

14 Facial series of three to four bristles with the dorsal penultimate bristle lacking or reduced to a short hair. Antennal segments I and II and basal two thirds of segment III pale. Brown abdominal fasciae large and covering majority of segment . . . . **stuckenbergi** sp. n. (p. 363)

— Facial series of two to three short, weak bristles in complete series. Antennal segments I and II dark, III pale. Brown abdominal fasciae reduced to patches **swarabica** sp. n. (p. 302)



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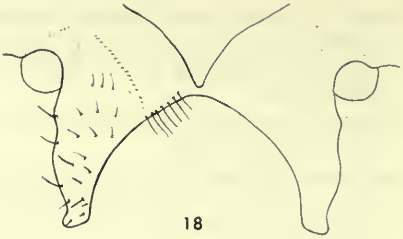

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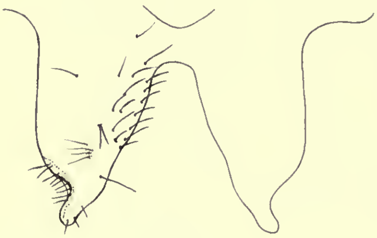

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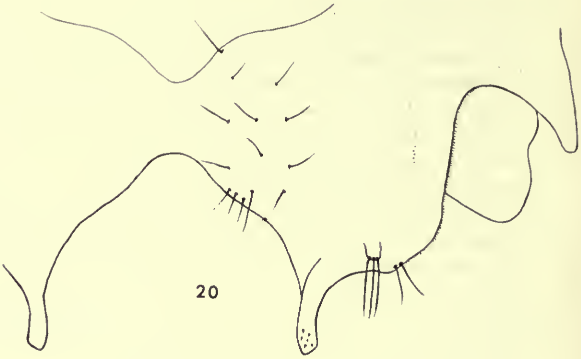

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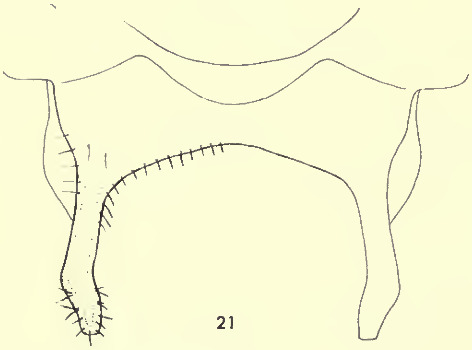

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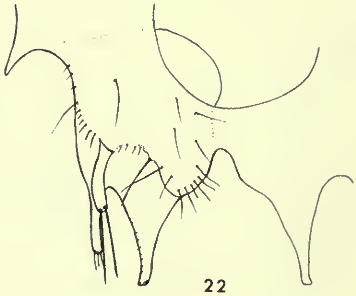

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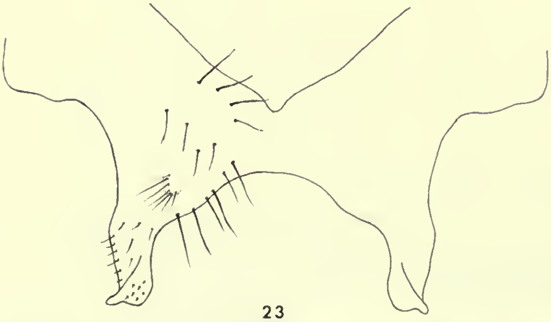

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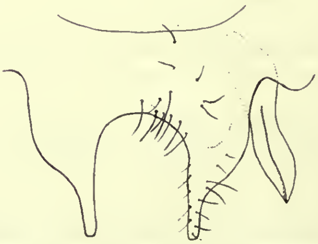

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FIGS. 17–28. Apical epandrial processes of *Notiphila* spp.: 17, *N. ignobilis* Loew; 18, *N. lyalli* sp. n.; 19, *N. frigidicola* sp. n.; 20, *N. cana* Cresson; 21, *N. omercooperi* sp. n.; 22, *N. irrorata* sp. n.; 23, *N. pokuma* Cresson; 24, *N. stuckenbergi* sp. n.; 25, *N. lunicornis* Soika; 26, *N. fuscofacies* sp. n.; 27, *N. pseudodimidiaticornis* Soika; 28, *N. pseudobscuricornis* Soika.

15 Frons and/or vertex with velvety black patches or lateral bands 16

— Neither frons nor vertex with velvety black patches or lateral bands ***obscuricornis* species-group** 17

16 Antennal segments I and II and majority of III pale, two large round velvety black patches on vertex, wings with veins strongly infumated ***bipunctata*** Loew (p. 306)

— Antenna black, lateral thirds of frons and vertex velvety black, median third bluish grey . . . . ***bivittata*** sp. n. (p. 312)

17 Antennae totally black or with very narrow pale strip at base of segment III . 18

– Antennae with at least basal third of segment III pale 20

18 Front tibiae dark, mesonotum with narrow brown vittae, quite distinct against lighter brown ground colour. Male epandrium with ventral apical process mucronate (Text-fig. 29) . . . . ***montana*** sp. n. (p. 309)

— Front tibiae pale basally for one third the length, mesonotum and frons dark brown vittae indistinct or lacking. Male epandrium with ventral apical process roundly truncate (Text-figs. 30, 31) 19

19 Mesonotal vittae totally lacking, face usually yellow, male epandrium as in Text-fig. 30 . . . . ***kenyaensis*** Cresson (p. 307)

— Mesonotal vittae present, face grey, male epandrium as in Text-figure 31 ***obscuricornis*** Loew (p. 306)

20 Fore tibia with at least basal third and apex pale 21

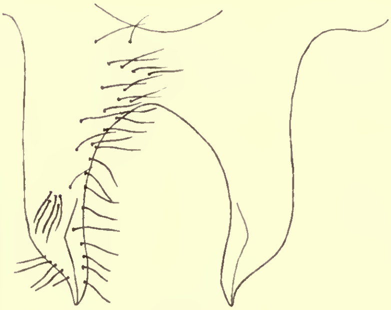
— Fore tibia almost totally dark or with at least apex dark 22

21 Fore tibia with at least half of length dark dusted . ***lineata*** Soika (p. 309)

— Fore tibia with only slight dark dusting . . . . . ***andrana*** sp. n. (p. 308)

22 Male epandrium with apical process truncate, median abdominal vitta narrow and constricted by brown fasciae 23

— Male epandrium broadly rounded apically, external claspers with a pronounced lateral expansion. Abdominal vitta broader and continuous ***dimidiaticornis*** Soika (p. 310)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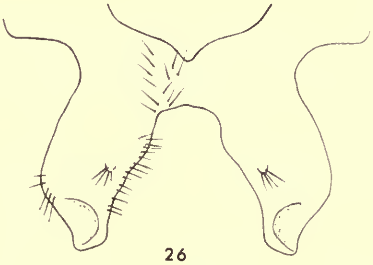
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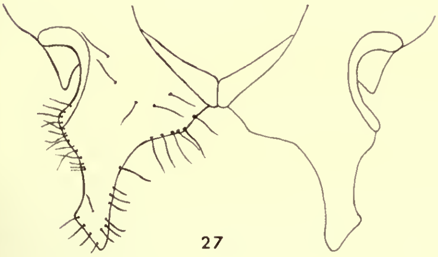
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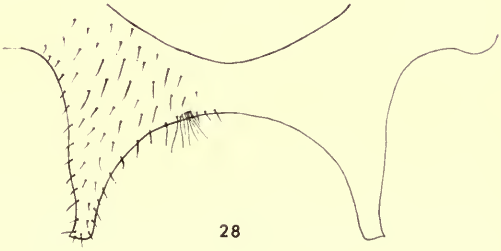
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Figs. 25–28.[1]

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[1] Legends opposite

23 Face silver-grey, with the carina darkened in lower half; male epandrium narrowly truncate apically (Text-fig. 33). Mesonotal vittae distinct . ***kufena*** sp. n. (p. 311)

— Face grey or white, carina unmarked; male epandrium truncate with terminal lateral protuberances bearing numerous setae 24

24 Face matt grey, antennae with basal third of segment III pale; male epandrium broadly truncate (Text-fig. 32) . . . . ***abdita*** sp. n. (p. 312)

— Face silver-grey, pleurae dark brown, wings infumated; male epandrium narrowly truncate apically (Text-fig. 36) . . . . . . ***ambata*** sp. n. (p. 313)

Notiphila* (*Notiphila*) *cana Cresson

(Text-figs. 3, 20.)

Notiphila cana Cresson, 1947 : 23.

To the brief description of the damaged type may be added the following diagnostic characters. Antennal segment III pale smoky in apical half. Eight to ten lateral hairs to the arista, base pale, the majority dark. One relatively strong divergent anterior fronto-orbital. A row of dense short bristles on the ventral surface of the first tarsal segment. Very weak bristling on the fore femora. Male ventral femoral fringe relatively weak, bristles only about equal to one third the width of the femur. A large species, up to 5 mm.

Hind metatarsus with four black spines to scopa and pale yellow pile along the length of the segment interspersed with stronger pale orange brown bristles.

General body colour cinereous with pale yellow legs, strongly grey dusted on femora and tibiae. Abdomen with a pair of very faint pale brown vittae on segments three, four and five. Male genitalia as Text-figs. 3 and 20.

Variation. The type from the Congo has considerably more brown on the notum than the majority of specimens I have seen, particularly those from the east of the Congo.

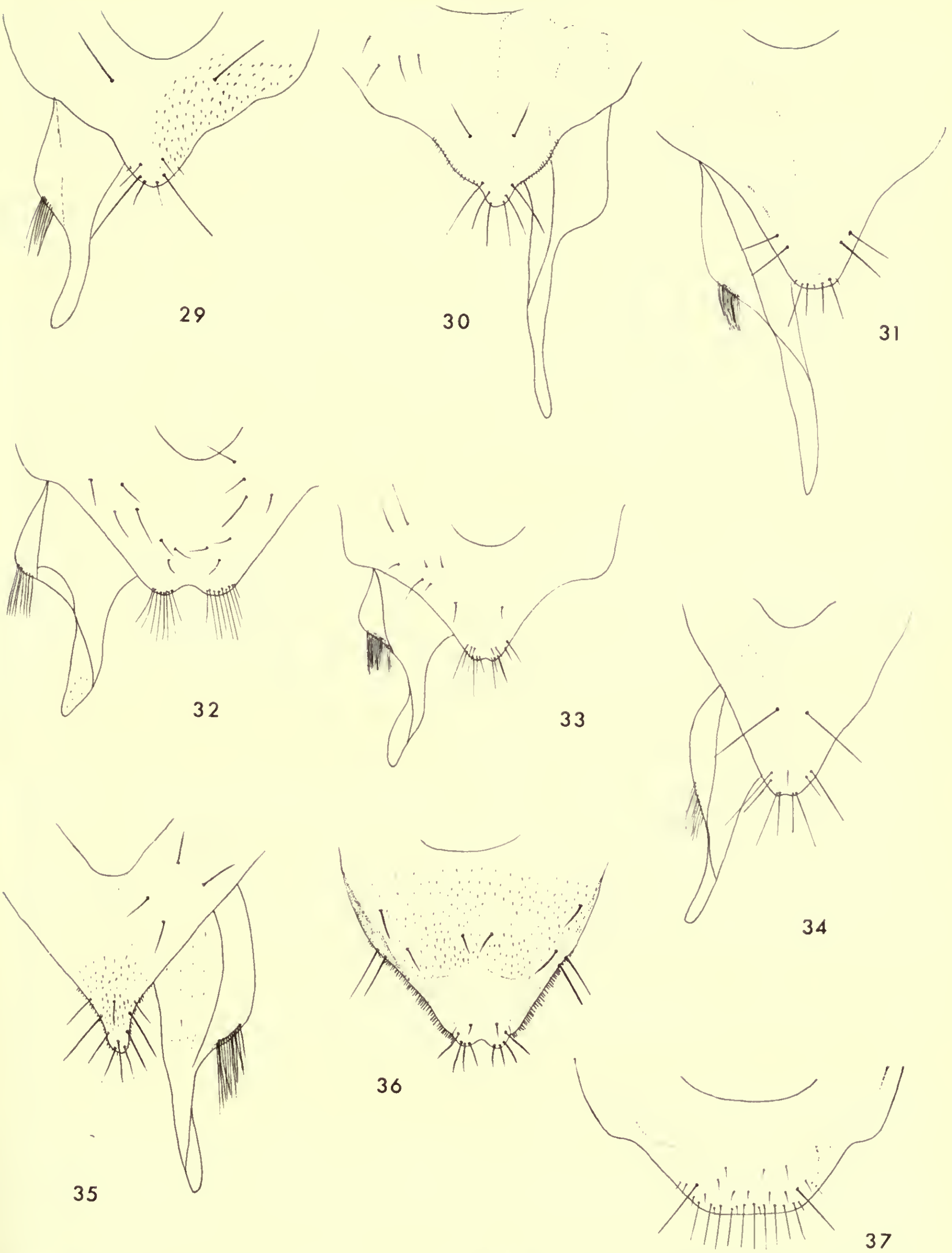
The pale pile on the hind metatarsus is reduced in some specimens and two specimens from Tanganyika have noticeably smaller eyes. Specimens from Nigeria have darker antennae, more vittate brown mesonotal markings extending on to the scutellum. The abdominal vittae are marked and broad. It is most closely related to *N. irrorata* sp. n.

Material studied. UGANDA: Sere Teso, 5 ♂, 3 ♀, iv.35 (*J. Ford*). TANGANYIKA: Ukiriguru, 1 ♂, 19.ix.58 (*I. A. D. Robertson*), on cotton; Tanga, at light, 1 ♀, 30.iv–1.v.1953 (*L. F. Brown*); Ukiriguru, 1 ♀, 12.ii.59 (*I. A. D. Robertson*), Light trap. ZAMBIA: Near lake Bangweulu, N'Salushi Island, 1 ♀, 13.xi.1946 (*M. Steele*). NIGERIA: Zaria, Samaru, 1 ♂, 1.iv.1966 (*J. C. Deeming*), M.V. trap; Zaria, Samaru, 1 ♀, 9.viii.1966 (*J. C. Deeming*), M.V. trap. MADAGASCAR: Maj. Amborovy, 1 ♂, 30.vi.1953 (*F. Keiser*); Maroantsetra, Ambodivoangy, iii.1952 (*R.P.*) Institute Scientifique Madagascar.

Notiphila* (*Notiphila*) *irrorata **sp. n.**

(Text-fig. 22)

A distinctive species, with an easily determinable character in the irrorations of the thorax. Every bristle arises from a dark brown patch of irregular outline. The thoracic vestiture is almost totally cinereous.



Figs. 29–37. Apical epandrial processes of *Notiphila*, at least one external clasper removed: 29, *N. montana* sp. n.; 30, *N. kenyaensis* Cresson; 31, *N. obscuricornis* Loew; 32, *N. abdita* sp. n.; 33, *N. kufena* sp. n.; 34, *N. lineata* Soika; 35, *N. andrana* sp. n.; 36, *N. ambata* sp. n.; 37, *N. dimidiaticornis* Soika.

♂. *Head:* antennae totally pale orange-yellow, with a very slight darkening of the tip of segment III. The arista has thirteen lateral hairs. The face, buccae and fronto-orbital strips are of a dull greyish yellow. The facials are very strong and curved, almost meeting in the midline, three in number with two shorter, much weaker bristles below. The buccal bristle is of the same size and strength as the longest facial. Numerous small hairs are set around and dorsal to the facial series. Two long, slightly subequal posterior buccal bristles. The last member of the posterior orbital series is long, two thirds outer vertical bristle, inclinate and almost meeting medianly.

Thorax: ground colour cinereous, with very light brown dusting on mesonotum. Base of all bristles brown, very slight on notopleural and humeral, very broadly so around the dorsocentrals. A single rectangular brown patch in centre of mesopleuron.

Wings: with membrane lightly infumated.

Legs. All legs pale, apart from grey dusted femora and slight darkening of apical tarsi. Fore femur with a series of seven to eight long, rather weak, bristles on postero-ventral face. Male 'comb' on mid femur well developed but bristles closely set and short. Hind metatarsal scopa of four, three short and one long, black bristles on pale yellow brush of hairs extending only over basal half of segment.

Abdomen: greyish green ground colour with two brown vittae and two broken bands of brown, lateral to them, on segments three and four. There are numerous small setae arising from small brown irrorations.

There are a number of specimens of this species in the collection of the I.R.S.A.C. Museum from the Congo, which apart from small differences in colour of mesonotum, which is darker, and less infumation of the wings, are identical with those of the type series. Due to their poor condition I have not included them as paratypes.

This discontinuous distribution is of considerable interest and suggests a very wide tolerance of climatic conditions.

The genitalia are very distinctive (Text-fig. 22) with two extra ventral projections in addition to the fused external claspers.

Holotype ♂. W. ADEN PROT.: Kirsh, *c.* 3,000 ft., 22.iii.1940 (*P. W. R. Petrie*), Aden Prot. Medical Survey, 'in bushes near water hole'. B.M.(N.H.).

Paratypes. 3 ♀, same data. B.M.(N.H.).

CONGO specimens—not paratypes. Kivu, Kavimvira (Uvira) à la lumière, 8 ♂, 12 ♀, i.1956 (*G. Marlier*); Rutshuru, 2 ♂, 11.v.36 (*L. Lippens*).

Notiphila* (*Notiphila*) *pokuma Cresson

(Text-fig. 23)

Notiphila pokuma Cresson, 1947 : 121.
Notiphila pokuma Cresson; Soika, 1956 : 501.

A large distinctive species easily distinguished from *Notiphila ignobilis* and *Notiphila cana,* which it resembles in body form, by the very strong facials, large size, long arista, darker colouring and the long bristles on the fore femora.

It is characterized by three large strongly curved facial bristles, plus a number of small bristles ventral to this series, almost totally pale antennae with an arista bearing up to fifteen lateral hairs. Three to five long bristles, twice the width of the femur, posteroventrally situated on the fore femora, and a variable series on the posterior face. Series of five to six strong bristles on anteroventral surface of mid femur. Hind metatarsus with black scopa on yellow background setae, the latter extending only over the basal half of the segment.

Large broad epandrium, ventral external claspers with short reflexed tip (Text-fig. 23), hypandrial sclerites with small rayed expansion at the apices.

Variation: considerable variation in size and colour of facial carina occurs, deep brown in West African material but completely absent in Malagasy and most East African specimens. Reduced to a pale brown spot in central and some Eastern specimens.

Material studied. Holotype. SIERRA LEONE: Pokuma, ♀, 3.ii.25, river bank (*E. Hargreaves*). MADAGASCAR: Fia, Mananjary, 1 ♀, 7.viii.58 (*F. Keiser*). NIGERIA: Zaria, Kufena, 2 ♂, 2 ♀, 14.2.66 (*J. M. Lyall*). CONGO: Elizabethville, 1 ♂, 11.ix.1931 (*A. Mackie*). KENYA: Nairobi, 1 ♀, vii.1930 (*V. G. L. van Someren*); Nyeri (S.), 1 ♂, x.48 (*V. G. L. van Someren*). GHANA: Ashanti, Obuasi, 1 ♂, 1.ix. 1907 (*W. M. Graham*), caught on mud in swamp; Ashanti, Obuasi, 1 ♂, 15.iv.06 (*W. M. Graham*). KENYA: Mt. Elgon, 1 ♀, xi.1935 (*F. W. Edwards*), Exp. Kapreteva, 6,500 ft. CONGO: Kivu, Kavimvira (Uvira), 39 ex., xii.1954 to i.1956 (*G. Marlier*) à la lumière; Ruanda, L. Karago, 1 ex., 21.iii.36 (*L. Lippens*); Kibali, Ituri, Kilomires, 1 ex., 10.iii.56 (*R. P. C. Smoor*); Elizabethville, 1 ex., 9.iii.49 (*C. Seydel*) à la lumière; Rutshuru, 1 ex., ix–x.1936 (*Delville*); Kamozobe (Sud Masisi), 7 ex., 4.iii.36 (*L. Lippens*); Rutshuru, 1 ex., 27.iv.36 (*L. Lippens*); Nyangwe, 1 ex., 4.v.1918 (*R. Mayne*). UGANDA: Entebbe, 1 ex., viii.59 (*P. L. G. Benoit*).

***Notiphila* (*Notiphila*) *frigidicola* sp. n.**

(Text-fig. 19)

♂. *Head:* antennae black with small reddish area at base of segment III and the apex of segment II. Arista black with eleven lateral hairs. Face golden with three long, curved, very strong facial bristles, the anterior pair meeting in the mid line. No smaller bristles, but a lateral series of hairs extends from the buccal edge to the point where the parafacials meet the frons. Parafacials golden grading to grey on the buccae. Buccal bristle as long as, but weaker than facials. Two subequal posterior buccal bristles. The short bristles on buccae, in lines extending to buccal edge and then in two rows to region of verticals. Palpi creamy white, with weak hairs on the lower portion of the exterior face. One relatively long, about one sixth the length of the fronto-orbitals, anterior ' fronto-orbital '. The most posterior vertical bristle long and meeting in the mid line. Frons with numerous small hairs on the lower third and five to six short orbital hairs. Frons with pale orbital strips, and a darker band delimiting the ocellar area. A pale region around the ocelli leading in a narrow band to the edge of the frons. Cheeks broad.

Thorax: normal setation arising from brown markings, plus numerous mesonotal and scutellar setulae. Pleura and mesonotum basically cinereous with heavy brown dusting on the majority of the mesonotum and mesopleuron. Sternopleuron with two instead of one large bristle in type male. Wings hyaline, slightly yellowish, with pale veins. Costa strongly spined and with two long bristles before humeral break. With three spines, two short and one long, in the plane of the wing and numerous short spines along the first section of the costa, leading to a larger spine just before the break, set at an angle of 60° to the plane of the wing on the dorsal face. Hind cross-vein concave and last section of the fifth long vein strong to the wing edge, very slight clouding around this area.

Legs. Fore leg: femur and coxa grey, latter with hairs over complete surface. Femur with five bristles, not very strong, on the posterior ventral series, longest equals the width of the femur. Four strong bristles in posterior series. Tibiae and tarsi pale but the latter appearing darker due to numerous dark hairs and some dusting. Mid leg: femur grey dusted with one strong spine in apical half on the anterior face, the usual strong male fringe, yellow knees and pale tarsi. Hind leg: femur grey with two strong spines on the apical one third of the anterior face, tibiae pale. Metatarsus with scopa of three black spines on pale hairs extending over only one third of the segment. Tarsi pale.

Abdomen: cinereous, strongly patterned with brown, strong bristles on the posterior edge of the last three segments. The brown markings almost totally delimiting the central cinereous vitta.

Length: 4·5–5 mm.

♀. Slightly stronger setation of the legs, more dark brown on the mesonotum and pleura, and the pale area of the hind basal scopa extending over half of the metatarsal segment. The wing costal bristles are weaker.

There is one specimen, which I believe to be of this species, but due to colour differences is not included among the paratypes.

Closely related to *Notiphila ignobilis* but differing in a number of ways; hind metatarsal comb basally yellow, generally darker, antennae largely so, and male genitalia with much elongated ventral processes (Text-fig. 19).

Holotype ♂. MADAGASCAR: Centre, Lac Froid, Dct. Ambotolampy, 11–15.xii. 57 (*B. Stuckenberg*), 1602 m.

Paratypes, topotypical, 2 ♂, 12 ♀. One other specimen not considered to be a paratype.

Holotype to the Natal Museum, plus 1 ♂ and 9 ♀ paratypes; 1 ♂ and 3 ♀ paratypes to the B.M.(N.H.).

Notiphila (*Notiphila*) *fuscofacies* sp. n.

(Text-fig. 26)

Very similar to previous species but face, frons and mesonotum, an unicolourous dark brown. Wings slightly infumated.

♂. *Head:* arista with ten lateral hairs, segments I, II, and III all pale but segment III with dark pubescences resulting in a sombre tinge, especially to apical two thirds. Ventral hairs on second segment a little more than one third the length of the third segment. Face golden brown, extending only to facial suture laterally, parafacial region buff grading to grey on buccal and posterior buccal regions. Facials of three strong curved bristles, the distance between their apices equal to half the length of the bristle, ventral to the strong bristles are a series of three small weak bristles. Facial series ventrally inserted on face, most dorsal only just above line of base of eye. Numerous short weak hairs, together with bristles, on raised lateral facial pads, the hairs extending from the lower facial angle to the lower fronto-orbital angle. Palps pale yellow in colour, sparingly haired. Long buccal bristle about one third width of the head. Buccal bristles relatively long and erect, basally in four to five irregular rows, becoming two rows dorsally. The two strong posterior buccal bristles ventrally directed, twice as long as surrounding bristles and only just subequal. The four or five bristles surrounding the main buccal bristle are anteriorly directed and one and a half times the length of the remainder.

Frons very uniform in colour, dark brown tinged with golden brown, and with iridescent shades of green when viewed at an angle. Frons divided by an indistinct band of lighter brown arising from the ocellar protuberance. Lower frons with numerous small hairs, orbital plates with seven to eight small hairs, one of which is relatively strong. Inner verticals longer than height of head, outer verticals two fifths length of inner; false posterior verticals crossing just before their tips. Final bristle of posterior orbital series twice the length of the penultimate.

Thorax: majority of mesonotum uniform dark brown with light gold dusting, central region between dorsocentrals with two indistinct lighter vittae on either side of a median brown band. The humeral angle and extension to the side of the notopleuron plus the non-bristled, most anterior portion of the thorax, greenish buff. The only other such region is a narrow area close to the supra-alar bristles. A normal complement of bristles on the mesonotum. Mesopleuron pale buff-brown with an indistinct central brown patch extending to stigma. The most dorsal bristle of the posterior series is weak and directed dorsally, the second less than half the third, two weak hairs between the latter and the ventral edge. Pteropleuron with dark brown patches. Sternopleuron and metapleuron olive-grey. Scutellum, when viewed from the posterior aspect, paler than mesonotum due to yellow-gold dusting, being most dense between apical bristles and giving rise to a pale yellow area. Disc and lateral areas covered with weak hairs, a pair of which are inserted between apical and basal bristles and stronger than the remainder.

Legs: all femora dark, usually strongly silvered, trochanters, tibiae and tarsi pale. Fore legs, minispines on ventral edge of femora extending over apical two thirds, fringe of hairs. along complete edge. Six outer, posteroventral bristles equal at their longest to a little in excess of width of femur. Metatarsal brush dark. Mid femur with series of four developed bristles on anterior face, two well developed. Posteroventral 'comb' present. Tibia with three erect dorsal spines. Hind femur with one strong pre-apical, anteroventral bristle. Metatarsal comb strong, black and one and a half to twice the width of metatarsus in length, short, about one third of metatarsal length, area of dense golden yellow brush on internal face of metatarsus.

Wings: only slight infumation, especially of costal edge. Basicosta with long bristles and three extra long and strong bristles, one just before humeral break. First section of costa with spines and long hairs, ending in three spines, one large spine, in plane of wing, plus a shorter spine preceding it, and one short spine set dorsally from the costal edge at an angle of 45 degrees. Second and third sections of costa with spines and ventral hairs one and a half times length of spines. Second section greater than twice length of third. Hind cross vein almost straight. Haltere with pale yellow club and slightly reddish base.

Abdomen: abdominal pattern with brown fasciae broken into dark brown isolated areas, median olive-buff vitta extending the length of the abdomen. Long bristles on posterior edges of segments four and part of three arising from brown irrorations. Bristles of posterior edge of fourth segment not extending beyond fifth segment. Brown central fasciae just attaining the posterior edge of segments, two, three and four. Male genitalia as Text-fig. 26.

♀. 11–13 hairs on arista. Palpi darker.

Holotype ♂. MADAGASCAR: Centre, Moramanga, 1,000 m., 18–24.xii.57 (*B. Stuckenberg*), N.M.

Paratypes. MADAGASCAR: Centre, Moramanga, 1,000 m., 4 ♂, 3 ♀, 18–24.xii.57 (*B. Stuckenberg*); Tananarive, Tsimbazaza. 1 ♀, i.49, (*R.P.*) Institute Scientifique, Madagascar. ' Sur riz '.

Notiphila (Notiphila) lyalli sp. n.

(Text-fig. 18)

This species is very closely related to *Notiphila ignobilis* but may be distinguished by the following characters.

Smaller size generally. Facial colour greyish yellow, facials shorter and more slender. Thoracic pattern more pronounced and generally darker and more intense. Abdominal pattern far bolder with dark brown fascia covering the majority of the abdominal segments. Central pale vitta narrow widening on last segment. Legs generally darker and male fringe on mid femur less pronounced.

♂ genitalia: aedeagus without the strong spines present in *Notiphila ignobilis*, epandrial processes as in Text-fig. 18.

This species is named after the collector, Mr. J. M. Lyall, who is at present engaged upon ecological research on this and related species.

Type and paratypes to B.M.(N.H.), five female and five male paratypes to collector. One male, not made a paratype, very heavily coated with golden brown pollen on frons and mesonotum.

Holotype ♂. NIGERIA: Zaria, Kufena, 15.vi.66 (*J. M. Lyall*) to B.M.(N.H.).

Paratypes. NIGERIA: Zaria, Samaru, 1 ♀, 16.ii.66 (*J. C. Deeming*), Irrigation ditch; Zaria, Kufena ponds, 2 ♂, 2 ♀, 30.iii.66 (*J. C. Deeming*); Zaria, Kufena ponds, 1 ♂, 12.iii.66 (*J. C. Deeming*); Zaria, Kufena, 9 ♂, 11 ♀, 15.vi.66 (*J. M. Lyall*); Zaria, Kufena, 2 ♂, 2 ♀, 4 ii.66 (*J. M. Lyall*). CONGO: Kasongo, 3 ♂, 1 ♀, viii.59 (*P. L. G. Benoit*); Kasongo, 1 ♂, ix.59 (*P. L. G. Benoit*); Rutshura, 1 ♀, ix–x.1936 (*Delville*).

Not paratypes. CONGO: Uele; Gangala na Bodio, 1 ex., 14.v.36 (*L. Lippens*); 6 ex., 15.v.36 (*L. Lippens*); 1 ex., 15.iv.36 (*L. Lippens*); Kasongo, rive du Lualaba, 1 ex., viii.59 (*P. L. G. Benoit*); Nyangwe, 3 ex., 4.v.1918 (*R. Mayne*); Haut-Uele: Paulis, 1 ex., iv.1947 (*P. L. G. Benoit*); Komi, Lodja, 1 ex., i.1930 (*V. Ghesquière*); Elizabethville, 1 ex., 16.xii.50 (*C. Seydel*) à la lumière; Rutshuru, 3 ex., ix–x.36 (*Deville*); Terr. Rutshuru, 1 ex., vii.137 (Mission Prophylactique); Kasongo, 1 ex., viii.59 (*P. L. G. Benoit*).

***Notiphila* (*Notiphila*) *microscopa* sp. n.**

Closely allied to species *N. omercooperi* sp. n., but lacking the grey patches on the vertex. The posteroventral spines on the fore femur longer and more hairlike, and the hind flexor scopa is extremely small, varying from a half to slightly less of the width of the metatarsus.

♂. *Head:* antennae black, arista dark and short with eight lateral hairs and just less than twice the length of the third segment. Face pale silver-grey with slight yellow undertones. The facial series is long, consisting of six, fairly weak and short bristles not strongly curved, with two or three of the hairs on the pads above facial bristles strengthened and equal to the facials, seemingly extending the series almost to the antennal foveae. Up to fifteen extra hairs set in parallel series to the facials. Carina weak and totally flat in the lower half of the face. Palpi orange-yellow, with numerous short hairs along the ventral edge of the palps. Buccae strongly yellowed. Buccal bristle equal in length to the facials. Posterior buccae with numerous small bristles, the lower edge with bristles slightly longer than those on the anterior edge. The longest posterior buccae are about two thirds of the buccal in length. The second posterior buccal is about two thirds of the longer one. Vertex and occiput are paler than the frons. Frons matt, orange-brown, divided medianly by a narrow pale stripe from the ocellar triangle. Anterior frons is covered with a short erect sparse pile. The two orbital strips are chocolate-brown when viewed at an angle to the light. One para-orbital relatively well developed, reclinate and outward pointing. Other head bristles are of normal proportions.

Thorax: mesonotum similar in colour to frons but with appreciably more olive-green dusting. Small setulae evenly scattered over the surface, those between the dorsocentrals not modified as acrostichals. The scutellum is of similar colouring but with fewer scattered hairs. The pleura gradually grade ventrally and posteriorly from an orange-brown on the mesopleuron and pteropleuron, to a paler olive-green or grey on the sternopleuron and metapleuron.

Wings: long, 2·6 times as long as wide. Costal index equals 2·5. The hind cross vein is straight, the wings are hyaline and the veins light brown. Ventral costal hairs are not obvious.

Legs: fore coxae with scattered hairs which are short over the lower two thirds. The femur is grey dusted. The posterodorsal series five to six in number, short and weak. The posteroventral series long, greater than or equal to the width of femur. Tibiae and tarsi pale, except last segment of latter, which is dark, broad, greater than penultimate. Mid coxa and femur grey dusted, one large pre-apical bristle on the anterior face of femur. Male femoral comb strong over the apical two thirds. Tibiae with three dorsal erect spines, plus a ventral pair of apical subequal larger spines, and four smaller. Tarsi pale with the last segment dark. Hind femur and coxa grey dusted, tibia pale; apart from the last segment the tarsi are also pale. Metatarsus with the thick pale pile over the basal third and the comb of two short spines, each less than the width of the metatarsus in length. The pale pile extends along the complete inner edge.

Abdomen: the first segment pale grey, other segments brown and grey. The pattern is very diffuse and on segments two and three the brown pattern is limited to the anterior two thirds, but the segments get progressively darker posteriorly. The last segment almost totally brown. There is a median grey vitta.

The female differs from the male in having the body colour either more green or grey, in one specimen golden pollen obscures the mesonotal pattern. The facials are less strong and the arista has a variable number of lateral hairs, from six to ten. The pale pile on the hind metatarsus may be less than a quarter of the length of the segment.

The frons of one specimen has an almost purple tinge when viewed at an angle to the light.

This is a distinct species, similar in external form to *Notiphila omercooperi* sp. n. and to *Notiphila pseudobscuricornis* Soika, but may be distinguished from either by the facial series, facial colour and size of the hind basal scopa of the posterior metatarsus, and from the former by the hind basal scopa, fore femoral posteroventral series which is spinose in *Notiphila omercooperi* and long and hairlike in this species.

Holotype ♂. ABYSSINIA: Wouramboulchi, Serpent Lake, *c.* 9,000 ft., 5.x.1926 (*J. Omer-Cooper*), to B.M.(N.H.).

Paratypes. 1 ♂, 11 ♀, same data as type.

***Notiphila* (*Notiphlia*) *omercooperi* sp. n.**

(Text-figs. 11, 21)

A good distinct species bearing most resemblance to *Notiphila kenyaensis*, but of course in the other subgenus as shown by the hind basal scopa and genitalia of male (Text-fig. 21).

The grey punctations on the vertex, the matt brown mesonotum and frons with velvety brown orbital strips, the narrow eyes and narrow hind basal scopa of metatarsus will distinguish this species from any other. Bristles on fore femora shorter and spinose, long and hairlike in *Notiphila microscopa*.

♂. *Head:* antennae totally black, segment III with pale pubescence, imparting a light golden hue to the segment when viewed at an angle to light. Arista black, short, with seven lateral hairs and less than twice the length of the third segment. Face golden yellow, the central carina round and prominent, due to the deeply excavated antennal fossae. Facial series of bristles weak, situated on short raised pads, consisting of three long curved bristles and two lower shorter bristles. Epistoma grey, palps orange-yellow, with numerous short hairs scattered over the external surfaces. Cheeks and buccae golden, similar to face, buccal bristle and the most anterior of the buccal hairs long. Two short, slightly subequal, stout, postbuccal bristles. Buccal hairs small and decumbent. The frons golden brown with green overtones, when viewed at an angle to the light. Dark strip divides the frons into two halves, orbital strip golden to chocolate-brown. Narrow orbital strip of a similar colour but extending beyond the fronto-orbital bristle to the anterior fronto-orbital angle. Vertex with two large pale grey areas extending from the mid occipital region to the level of posterior ocelli, on either side of the ocellar triangle. Remainder of vertex dark brown. Fronto-orbital bristle in length equal to outer vertical. Eyes narrow, horizontally inclined and elongate, cheeks broad, wider than vertical width of eye.

Thorax: mesonotum a uniform matt orange-brown with pale green dusting. Numerous small hairs are scattered over the mesonotum, those between the dosocentrals not developed as distinct acrostichals. Scutellum of similar colour to the mesonotum, the tip is covered with long pale hairs. Two or three prescutellar hairs are stronger than the rest. Mesopleuron and pteropleuron brown with a grey area on the lower, anterior third. Dorsal mesopleural equal half the ventral mesopleural. Hairs ventral to the bristles only a little stronger than general mesopleural hairs. Remainder of the pleura grey.

Legs: fore coxae grey with short hairs over all but the basal quarter. Trochanter grey, femur, tibia and tarsi darker dusted. Posteroventral series of bristles eight in number, short and stout and greater than the width of the femur in length. Last tarsal segment broad, greater than the penultimate at apex, with one long hair inserted dorsally and two shorter hairs on either side. Lateral ventral apical bristles on all tarsal segments equal to the width of the segment in length or slightly greater. Mid coxa and femur grey-brown dusted, mid-anterior series of bristles three in number, all strong and shorter than width of femur. Anteroventral series well developed and curved (secondary male character). Femur grey dusted at base. Tibiae with dark dusting on greyish background dusting. Pulvilli large and conspicuous on all legs. Mid tibial apical crown of spines consisting of two ventral subequal spines and four lateral small spines. Tarsi pale with dark dusting. Hind coxae dark, femur grey dusted at base, darker apically. One stronger bristle on the apex of the anterior face. Metatarsal comb is very narrow and consists of two bristles and is a little longer than the segment is wide, dense hair yellow and the shorter yellow hair extends along the complete posterior edge of the segment, while the denser long hair extends only over the basal half.

Wings: long, over 2·5 times as wide. Costal index 2·7. Veins pale brown. Spines at second break only thirty degrees apart. Costa with a ventral row of hairs less than twice the width of the costa. Hind cross-vein concave. Halteres pale on club, darker orange-yellow on stalk.

Abdomen: first segment light grey. Lateral areas of second segment also light grey. Rest of abdomen with fasciated pattern, very indistinct and grey areas with a distinct olive green sheen.

♀. Spines on fore femora vary in number and size but not in form. Olivaceous dusting more noticeable on some. Hind cross vein almost straight, only just concave.

Face more silvery but still with a distinct yellow tinge. One specimen, probably of this species has the grey markings almost obscured although the outlines are visible. The face is more greyish.

Holotype ♂. ABYSSINIA: Wouramboulchi, Serpent Lake, *c.* 9,000 ft., 5.x.1926 (*J. M. Omer-Cooper*) to B.M.(N.H.).

Paratypes. 1 ♂, 7 ♀, all same data as type, to B.M.(N.H.). CONGO: Ruanda, Gite de Nkuli, 6 ♂, 9 ♀, 17.iii.36 (*L. Lippens*); Kivu, Saka, 1 ♂, 14.iii.36 (*L. Lippens*). All to M.R.A.C.

Not paratype. Ruanda, Gite de Nkuli, 1 ♂, 17.iii.36 (*L. Lippens*).

Notiphila (Notiphila) pseudodimidiaticornis Soika

(Text-figs. 8, 27)

Notiphila pseudodimidiaticornis Soika, 1956*b* : 125.

A member of the broad cheeked group of species easily distinguished from *Notiphila microscopa* by means of the very short series of facial bristles, ventrally inserted, and the larger hind metatarsal basal scopa which is appreciably longer than the segment is wide. In body form and colouring it closely resembles *Notiphila microscopa* sp. n.

The following brief description characterizes the species. Antennal segments I and II black, segment III dark with slight paling of base; eight to nine lateral hairs to arista. Face and buccae grey, facial series of two to three short but strong bristles, set ventrally, extensive lateral series of hairs. Frons uniformly dark brown.

Mesonotum, scutellum, mesopleura and pteropleura dark brown, becoming grey ventrally. All femora grey-brown, mid and hind tibiae and tarsi pale. Fore femur with the posteroventral series of weak bristles, equal in length at longest to width of femur. Fore tibiae and tarsi with dark dusting. Hind metatarsus with a basal scopa of three long black setae with the pale golden yellow brush of hairs extending over half the length of the metatarsus.

Wings: veins pale, with a very slight infumation of the membrane.

The abdomen has the greyish green posterior fasciae reduced to lateral 'wedges' while the median vitta is narrow. The fourth segment has three to four pairs of long setae inserted on the posterior edge. Male genitalia with characteristic lateral broadening of the ventral processes (Text-fig. 27) and a strongly spinose aedeagus.

Material studied. CONGO: Ruanda, Gite de Nkuli, 36 ex., 17.iii.36 (*L. Lippens*); Rutshuru, 1 ex., 11.v.36 (*L. Lippens*); Ruanda, Gite de Nkuli, 2 ex., 25.iii.36 (*L. Lippens*); Ruanda, L. Karago, 2 ex., 21.iii.36 (*L. Lippens*); Kivu, Sake, 5 ex., 14.iii.36 (*L. Lippens*); Ruanda, L. Nyakigubu, 1 ex., 25.iii.36 (*L. Lippens*).

Notiphila (Notiphila) lunicornis Soika

(Text-fig. 25)

Notiphila lunicornis Soika, 1956*b* : 124.

A large species, recorded only from the Congo. The colour of the hind metatarsal setation delimits this species from all but *Notiphila ignobilis* Loew, and *Notiphila lyalli* sp. n. Easily distinguished from both by the weaker and more ventral facials, larger size, dark antennae and pale fore tarsi.

Antennae totally dark, some pale dusting on the first and second segments, arista with ten lateral hairs. Face golden, buccae grey. Frons, mesonotum and majority of the abdominal segments dark brown. Two strong curved, short facial bristles. Pleura, and laterally on mesonotum, olive-green to grey, legs yellow with strong grey dusting on femora. Posteroventral bristle series of fore femora, equal in length to the width of the femur, five in number. Hind metatarsus in lateral view with scopa of three strong black spines, and dark pile along the complete internal edge. Four to five millimetres in length. Male epandrial processess as Text-fig. 25.

Material studied. CONGO: Ruanda, L. Karago, 6 ♂, 8 ♀, 21.iii.36 (*L. Lippens*); Ruanda, Gite de Nkuli, 3 ♀, 17.iii.36 (*L. Lippens*); Kamogobe (Sud Masisi), 1 ♂, 4.iii.36 (*L. Lippens*).

***Notiphila* (*Notiphila*) *pseudobscuricornis* Soika**

(Text-fig. 28)

Notiphila pseudobscuricornis Soika, 1956*b* : 124.

Similar in form to *Notiphila omercooperi* and *Notiphila microscopa* but easily distinguished from both by means of frontal pattern (no grey patches), and hind scopa and genitalia (Text-fig. 28). This species possesses a reduced form of the 'fan-like' hypandrial sclerites of the other two.

Antennae black, segment III with pale pubescence, ten hairs to arista. Face golden with four long, curved, very weak facials. Buccal bristle also long and weak.

Bristling on fore femora long but weak, equal in length to the width of the femur. A number of erect short hairlike bristles on fore tibia. Hind metatarsal scopa short, with pale setation over complete internal face. Body colour similar to *Notiphila lunicornis* and 5–6 mm. in length.

I have only seen specimens of this species from the Congo.

CONGO: Ruanda, Gite de Nkuli, 71 ex., 17.iii.36 (*L. Lippens*); Ruanda, L. Karago, 56 ex., 2.iii.36 (*L. Lippens*); Kamogobe (Sud Masisi), 1 ex., 4.iii.36 (*L. Lippens*); Kivu, Sake, 6 ex., 4.iii.36 (*L. Lippens*); Rutshuru, 2 ex., 11.v.36 (*L. Lippens*).

***Notiphila* (*Notiphila*) *swarabica* sp. n.**

Related to *Notiphila ignobilis* and of similar size and form but differing most noticeably in possessing weaker facial bristles and yellow hind metatarsal brush.

♂. *Head:* antennal segments I and II dark, segment III pale with dusky tip and dorsal rim. Arista pale with two lateral hairs, arista nearly twice as long as segment III. Face golden yellow, carina strong over the dorsal two thirds of the face. Lateral pads just discernible with numerous weak hairs extending from the lower buccal angle to just short of the antennal foveae. Four weak, but long and curved bristles in the facial series, separated medially by less than half of the length of one bristle. Epistoma grey dusted, palps pale orange-yellow with six small hairs along the ventral edge of the external face. Cheeks narrow. Parafacial region yellow, grading to grey on the cheeks and posterior buccae. Buccal bristle shorter than, but of similar strength to, the lower facial bristles. Posterior buccal bristle of same size and strength as buccal. Postbuccal region, the postocular, darker grey and covered with short decumbent bristles. Frons dark greenish brown, the shade of brown depending on the angle of the light, the anterior region with a few weak hairs. Light brown area around ocellar triangle extending to the anterior frontal suture. Para-orbital plates pale buff when viewed at an angle, with a number of long thin hairs along their length, being most noticeable between the verticals and the fronto-orbital. One small extra proclinate 'fronto-orbital'. Longest of the hairs on the ocellar triangle behind the ocellar bristles less than half the length of the ocellars. Posterior vertical bristles long, almost meeting medially.

Thorax: mesonotum pale greyish brown, with numerous decumbent hairs evenly scattered over the mesonotal surface and those between the dorsocentrals not arranged in rows or modified in any way as acrostichals. Scutellum of a similar colour and with scattered hairs. Two faint darker brown bands along the sides of the mesonotum passing through the intra-alar bristle to the scutellar suture. Pleura almost totally grey, except for a slight pale brown dusting on the dorsal edge of, and a small dark brown patch in the centre of, the mesopleuron. Hairs on the pleura short and weak.

Legs: fore legs: coxae grey with very short hairs in irregular rows, and three strong bristles extending from the apex. Femur grey dusted, one member of the posterodorsal series very strong, longer than the width of the femur. Posterior dorsal series well developed, six in number and slightly curved. Tibiae slightly darkened, especially on the apical two thirds. Black hairs on the posterior face slightly elongated, producing a dark comb effect. Tarsi pale, last segment darker and only slightly wider at apex than at base. Middle legs, femur grey dusted and apart from the male combs has two strong bristles inserted on the anterior face, about one third the distance from the apex. Tibiae totally pale, with three erect dorsal spines, two subequal apical spines ventrally, plus a number of small spines around the base. Tarsi pale apart from the last segment. Hind legs, femur grey, no strong bristles. Hind tibiae darkened on the dorsal side, with three short ventral spines. Hind metatarsus with a comb of four long black spines and a pale yellow pile extending thickly over the basal third and then shortening to the apex. Tarsi pale apart from the last segment.

Wings: broad, two and a half times as long as broad, veins pale brown, darker on the hind part of the wing and the hind cross vein. Spines at the break at an angle of greater than 45°. Haltere with a pale yellow club and orange-yellow base.

Abdomen: median grey vitta broadening posteriorly to include the majority of the last segment. The chocolate-brown fasciae on the anterior half of the segment, except where it delimits the grey median vitta and there, reaches the ventral edge of the segments. The first segment is totally grey. There are long hairs on the last and the penultimate segments.

The male genitalia are similar to *Notiphila ignobilis*, with the aedeagus strongly armed with black spinules, but the ventral projections are attenuated.

Material studied. One male with the same data as holotype, but with more brown on the mesonotum; as part of the face and frons are missing this specimen is not included as a paratype. Three females with the same data as holotype but differing from the type in having slightly darker legs and third antennal segments, fewer small facial bristles and less brown on the abdomen. One specimen has the mesonotum slightly golden.

Holotype ♂. YEMEN: Ghaiman, about nine miles S.E. of Sana, *c.* 8,700 ft., 18.ii.1938 (*H. Scott* and *E. B. Britton*). ' Found near irrigation stream '.

Paratypes. 3 ♀, same data as type. All types to B.M.(N.H.).

Notiphila (Notiphila) ignobilis Loew

(Text-fig. 17)

Notiphila ignobilis Loew, 1862 : 12.
Notiphila ignobilis, Loew; Cresson, 1947.
Notiphila ignobilis Loew; Wirth, 1956.
Notiphila ignobilis Loew; Soika, 1956.

This is the most widespread and common of the Ethiopian species of *Notiphila*, and shows considerable variety of form. The variation in the male genitalic structures, between widely separated areas, is sufficiently distinct to suggest some geographical subspeciation. The three male specimens from which Loew described this species are all from Southern Africa. I have designated a LECTOTYPE and two paralectotypes, the lectotype specimen is that from Caffraria mentioned by Cresson (1947 : 120).

LECTOTYPE ♂. A pale generally cinereous specimen, with greatly reduced abdominal pattern. *Head:* the arista has ten lateral hairs. Antennal segments I and II pale orange-yellow, antennal segment III with tip dusky, basal half pale reddish orange. Face yellow, pale, with three pairs of large, strong bristles plus three smaller bristles in the ventral extension of the series. Buccae yellow grading to grey on the postbuccae. Porrect buccal bristle long, about three fifths the length of the head. Buccal bristles long and erect, two long equal post-buccal bristles. Frons grey-brown with golden brown dusting. Inner vertical bristles equal to height of the head and outer vertical bristles three quarters the length of the inner.

Thorax: mesonotum olive-buff with slightly browner, very indistinct, areas and median vittae. Mesopleuron with a very pale and indistinct brown patch and three very weak bristles between the lower strong bristle and the ventral edge of the mesopleuron.

Legs. All legs, apart from the heavily grey dusted femora, pale. Hind metatarsal segment with a black scopa and a black dense brush of setae. Fore femoral minispines very distinct, about two thirds apical anteroventral length, outer series of bristlelike hairs six in number, and at their longest equal to the width of the femur.

Wings, with pale orange-yellow veins. Hind cross vein almost straight.

Abdomen: abdominal brown markings in a series of four broken bands, the centre pair delimiting the median light brown vitta. Most lateral bristles arising from brown markings. Epandrial processess as Text-fig. 17.

In common with many other species of *Notiphila, N. ignobilis* has occasional specimens in any series with variable amounts of dark golden yellow dusting, often completely obscuring the underlying pattern.

Considerable colour variation occurs in other areas, none of them consistent enough, in my opinion to warrant subspecific rank. The face may be strongly dusted with grey, almost masking the yellow in places, frons and mesonotum may be dark brown and the abdomen with strong brown fasciae. These described variations are particularly prevalent in Southern, Eastern and Malagasy regions of Africa. Specimens from Northern, Western and Central Africa often have very pale yellow facial regions, and very few brown markings on the thorax and abdomen.

A very small race of this species is found in some regions of the Congo.

Material studied. SOUTH AFRICA: Natal, Ahrens district, nr. Lilani, 6 ♂, 5 ♀, iv.1962 (*B. & P. Stuckenberg*); Transvaal, Nelspruit, 1 ♂, xi.1959; Transvaal, Skukuza, 1 ♀, 23.xi.1959; Port St. Johns, 1 ♀, 20–25.xi.1961 (*B. & P. Stuckenberg*); Natal, Pinetown district, Gillitts, 1 ♀, 20.xii.1961 (*B. & P. Stuckenberg*). Basutoland, Maseru District, Maloti Mountains, Makhaleng Valley, Blue Mountain Pass, 2,150–2,525 m., 1 ♀, 12–14.i.1963 (*B. & P. Stuckenberg*). MADAGASCAR: Fenerive, Lagoon shore, 1 ♂, 3 ♀, xii.1955 (*B. Stuckenberg*); Ranomafana, 3 ♂, 2 ♀, xii.1955 (*B. Stuckenberg*); Fenerive, 1 ♀, xii.1955, (*B. Stuckenberg*), on beach; Perinet, 1 ♂, xii. 1955 (*B. Stuchenberg*); Tananarive, Tsimbazaza, 1 ♂, 3 ♀, ii.49 (*R.P.*) Inst. Scient. Madagascar. 'Sur Riz'; Ranomafana, Ifanadiana, 1 ♀, Inst. Scient. Madagascar; Sandrangato, 1 ♂, 1 ♀, Inst. Scient. Madagascar; Centre, Plateau Soaindrana, 2,060 m., Andringitra-Ambalavao, 5 ♂, 12 ♀, 14–17.i.58 (*B. Stuckenberg*); Centre, Vakoana, 1,520 m., Andringitra Ambalavao, 1 ♂, 1 ♀, 21–24.i.58 (*B. Stuckenberg*); Est, Navana-Antongil, 6 m. dct. Maroansetra. 1 ♂, 1 ♀, 20–25.iii.58 (*B. Stucken-*

berg); Centre, Station Agric. Aloatra, 800 m., dct. Ambatondrazaka, 2 ♀, 24.xii.57 (*B. Stuckenberg*); Est, Ivontaka, 15 m., dct. Mananara. 1 ♂, 1 ♀, 10–14.iii.58 (*B. Suckenberg*); Centre, Moramanga 1,000 m., 18–24.xii.57 (*B. Stuckenberg*); Sandrangato, 2 ♂, 3 ♀, Institut Scientifique Madagascar; Sandrangato, 2 ♀, Institut Scientifique Madagascar; Ranomafana, Infanadiana, 1 ♂, Institut Scientifique Madagascar; Perinet, 1 ♂, 2 ♀, Institut Scientifique Madagascar; Sakotary, 10 km. Nord de Tananarive. 1 ♀, 8.i.18 (*R.P.*); Andobo, 190 m., Forêt Ansingy, dct. Antsalova, 1 ex., ii.57 Institut Scientifique Madagascar; Tam. Perinet, 1 ♂, 6.x.58 (*F. Keiser*); Tam, Perinet, 1 ♂, 13.iv.58 (*F. Keiser*); Tan. Tananarive, 1 ♂, 22.iv.58 (*F. Keiser*); Tan. Tananarive, 6 ♂, 4 ♀, 14.vii.58 (*F. Keiser*); Tan. Tananarive, 2 ♂, 28.viii.58 (*F. Keiser*); Maj. Amborovy, 7 ♂, 10 ♀, 30.vi.58 (*F. Keiser*); Fia. Ranomafana, 1 ♂, 2.viii.58 (*F. Keiser*); Fia. Ranomafana, 2 ♂, 1 ♀, 3.viii.58 (*F. Keiser*); Tul. Beraketa, 1 ♂, 5.ii.58 (*F. Keiser*); Tam. Moroantsetra, 1 ♂, 4.v.58 (*F. Keiser*); Tam. Moroantsetra, 1 ♂, 29.iv.58 (*F. Keiser*); Tan. Ampefy, Chute d. I. Lily, 1 ♀, 26.iii.58 (*F. Keiser*); Fia. Mananjary, 1 ♀, 13.viii.58 (*F. Keiser*); Fia. Mananjary, 1 ♂, 2 ♀, 11.viii.58 (*F. Keiser*); Tam. Perinet, 1 ♀, 21.ix.58 (*F. Keiser*); Tam. Perinet, 1 ♀, 2.x.58 (*F. Keiser*); Fia. Ambalamanakana, 1 ♀, 19.i.58 (*F. Keiser*); Fia. Ambalava, 2 ♀, 29.i.58 (*F. Keiser*); Tam. Moramanga, 1 ♀, 20.xii.57 (*F. Keiser*); Tan. Ampefy, Lac Kavitaha, 1 ♂, 2 ♀, 28.iii.58 (*F. Keiser*); Maj. Amboromalandy, 2 ♀, 2.vii.58 (*F. Keiser*); Fia. Ranohira, 1 ♀, 6.iii.58 (*F. Keiser*); Tam. Tamatave, 1 ♀, 1.xi.58 (*F. Keiser*); Tan. Tanarive, 1 ♀, 13.xii.57 (*F. Keiser*); Fia. Mananjary, 1 ♂, 16.viii.58 (*F. Keiser*); Tan. Manjakatompo, 1 ♀, 3.i.58 (*F. Keiser*) Licht-Fang; Tan. Antsirabe, 3 ♀, 15.i.58 (*F. Keiser*), 'Licht-fang'.

Nigeria: Zaria, Kufena ponds, 2 ♂, 3 ♀, 30.iii.66 (*J. C. Deeming*); Ibadan, 2 ♀, 16–19.i.66 (*J. C. Deeming*); Bida, 1 ♀, 21.xii.65 (*J. Lyall*); Zaria, Samaru, 10 ex., 25.v.1966 (*J. C. Deeming*), Irrigation ditch.

Abyssinia: Marsh nr. Lake, Hora Abjata, *c.* 5,000 ft., 5 ex., 18.xi.26 (*J. Omer-Cooper*); Mount Zuquala, *c.* 9,000 ft. 4 ex., 22.x.26 (*J. Omer-Cooper*).

Uganda: Katosi, 3 ex., 20.ix.1933 (*E. G. Gibbins*), on debris at edge of lake.

Angola: Huila district, 1 ex.; Rio Coroca, 8 mls. N. of Porto Alexandre, 23.vi.1954 (*J. Balfour-Browne*), flying round pools.

Tanganyika: Ukiriguru, 2 ex., 12.ii.59 (*I. A. D. Robertson*), Light trap.

Zambia: Nr. Lake Bangweulu, N'Salushi Island, 1 ex., 16.xi.46 (*M. Steele*).

Uganda: Ruwenzori Range, Kilembe, 4,500 ft., 1 ex., xii.1934–i.35 (*F. W. Edwards*).

Rhodesia: Mazoe, 1 ex., 10.vi.28 (*A. Cuthbertson*).

Kenya: Kazinga Ferry, 4 ex., viii.46 (*Van Someren*); Meru, 2 ex., vii.43 (*Van Someren*); L. Nabugabo, 6 ex., viii.46 (*Van Someren*); Nairobi, 1 ex., vii.30 (*Van Someren*); Mivea, 3 ex., 4.xii.56 (*J. F. Graham*), Rice stems.

Subgenus ***AGROLIMNA*** Cresson

Type-species, *N. scalaris* Loew, 1862 : 134 (Orig. design.).

Established by Cresson (1917) for those species with the following combination of characters.

Facial series consisting of weak hairlike bristles, inserted over the complete vertical length of the face. Four erect dorsal spines on the mid tibiae, no male mid femoral comb of setae on ventral face of femur. Basal scopa of bristles on hind metatarsal segment pale yellow to dark brown, never black. Male genitalia with external claspers or surstyli fused to ventral aspect of epandrium (Text-fig. 4).

With the exception of *Notiphila* (*Agrolimna*) *bipunctata* Loew, a most homogeneous group of species with rather slight specific differences and requiring confirmation of any determination by genitalic comparisons.

Notiphila* (*Agrolimna*) *bipunctata Loew

(Text-figs. 1, 2, 5, 6)

One of the most distinctive of *Notiphila* species, easily distinguished from all others by the two velvety black patches on the vertex. The male genitalia show an intermediate condition between that of the two subgenera (Text-figs. 1, 2, 5, 6), while the external claspers are free of the epandrium, the ventral edge of the epandrium is produced into two rounded protuberances.

♂. *Head:* antenna almost totally pale, slight darkening on dorsal edge of segment III. Thirteen hairs to arista; very strong curved spine on segment II. Face pale golden yellow with central carina brown over ventral half. Facial hairs long but weak. Buccae silver-grey. Two velvet black patches between fronto-orbital and large inner verticals.

Thorax: fore legs darkened, fore tarsi paler than the mid or hind tarsi. Femur and last two segments of tarsi darkened on middle leg, femur and apical half of tibia on hind leg. Five broad, brown stripes on mesonotum, grey-green ground colour. One stripe from humeral region to large posterior bristle on mesopleuron, rest grey.

Abdomen: brown fasciae delimit central grey vitta which extends on to second segment.

Wings with deep cleft at break and veins clouded strongly along their length.

Material studied. Holotype ♂. AFRICA: Svakop, 53 325, (*J. Wahlb.*).

CONGO: Katanga, Tenke, 1 ♂, 30.vii.–9.viii.31 (*J. Ogilvie*).

S. AFRICA: Transvaal, Kruger National Park, 1 ♂ (*T. D. A. Cockerell*); Umtabi, Tronskri, 1 ♀, 18.ii–18.iii.23 (*R. E. Turner*); Natal, Weenen, 1 ♀, xi.1928–iii.1929 (*H. P. Thomasset*); Natal, Drakensberg, 1 ♂, iii.1959 (*B. R. & P. J. Stuckenberg*); Cathedral Peak Area, 1 ♂, 1.i.54 (*B. Stuckenberg*).

RHODESIA: Salisbury, 1 ♂, iv.1927 (*A. Cuthbertson*); Rhodes, Inyanga Park, 1 ♂, 13.i.55 (*B. R. Stuckenberg*); Umtali, 1 ♀, i.1955 (*B. R. Stuckenberg*).

MOZAMBIQUE: Nr. Machipanda, 1 ♀, 19.i.55 (*B. R. Stuckenberg*).

KENYA: Kiabiti Hill, Embu, 1 ♂, vii.1948 (*Van Someren*).

Notiphila* (*Agrolimna*) *obscuricornis Loew

(Text-fig. 31)

Notiphila obscuricornis Loew, 1862 : 12.
Notiphila venusta obscuricornis (Loew) Cresson, 1947: 118.
Notiphila obscuricornis Loew; Wirth, 1956 : 387.
Notiphila subcornuta (Soika) Soika, 1956*b* :125.

A relatively large species for this subgenus, from southern and eastern regions of Africa, replaced in the Congo by *Notiphila dimidiaticornis* Soika, and on Madagascar by *Notiphila andrana* sp. n., from both of which it may be distinguished by antenna colour, fore tibial dusting and male genitalia (Text-fig. 31).

Loew's original type series consisted of two female specimens, from which I designate as LECTOTYPE the specimen bearing the following data. 'Svakop. Africae; J. Wahlb, 50,323. (245,66). Rikmuseum, Stockholm'.

The female paralectotype bears the following data. 'Svakop. Africae. J. Wahlb, 53,329. (245, 66) Rikmuseum Stockholm'. Both type specimens are returned to the Stockholm Museum.

Lectotype ♀. The following are emendations and additions to Loew's original description.

Head: antennal segments I and II dark, segment III dark dorsally and apically. Thirteen hairs to arista. Facial hairs short, not greater than half the buccal bristle length and less than half as strong. Two slightly subequal posterior buccal bristles. Fore femur with three widely separated rows of closely set hairs on the posteroventral and ventral faces. Fore tibiae pale with dark dusting on the apical two thirds. Fore metatarsus with, slight yellow basal scopa and numerous dark hairs and weak bristles. Tarsi progressively darker towards apex. Mesonotal stripes very obscure, hidden by ground colour, latter extends on to pleura as far as the largest of the posterior mesopleural bristles. One large bristle on anterior face of middle femur. Middle tarsal segment dark. Hind tibiae pale without brown area on apical half. Apical two tarsal segments darkened.

Wings: brown veined, slight infumation.

Abdomen: brown fasciae strongly delimited on all but the second segment.

South Africa: Natal, Weenen, 1 ♂, 1 ♀, iii–iv.1925 (*H. P. Thomasset*); Pretoria, 1 ♀, v.1948 (*J.C.F.*); Natal, Nr. Thornville, Umlazi River, 1 ♂, 27.iv.55 (*B. Stuckenberg*); Pietermaritzburg, Town Bush, 1 ♂, 6.x.60 (*B. & P. Stuckenberg*); Natal, nr. Richmond, Taberi River, 1 ♀, 27.iv.55 (*B. Stuckenberg*); E. Transvaal, Marlepskop, 1 ♀, x.56 (*B. Stuckenberg*); E. Cape Province, Barkly East District, Lundeans Nek, 1,925–2,100 m., 1 ♂, 18.i.63 (*B. Stuckenberg*); Natal, Ahrens District, Ns. Lilani, 1 ♂, 1 ♀, iv.62 (*B.* and *P. Stuckenberg*); Pietermaritzburg, Town Bush, 1 ♂, 12.xii.61 (*B. & P. Stuckenberg*); Natal, Drakensberg, Cathedral Peak Area, Alt. 6,400 ft., 1 ♂, 23.iii.55 (*B. Stuckenberg*).

Rhodesia: Nr. Umtali, Vuma Mount, 1 ♀, 18.i.55 (*B.R.S. & P.G.*); Rhodes-Inyanga National Park, 1 ♂, 13.i.55 (*B.R.S. & P.G.*).

Notiphila* (*Agrolimna*) *kenyaensis Cresson

(Text-figs. 12, 30)

Notiphila venusta kenyaensis Cresson, 1947 : 119.
Notiphila kenyaensis (Cresson) Wirth, 1956 : 387.

Cresson, in his description of this species stated, that the face is grey. I believe that he was referring to an uncommon form, of which I have seen only one or two specimens. The usual facial colour of the species I recognize as *Notiphila kenyaensis* is yellow, with grey parafacials. As I have not seen the type, it may be that the species I recognize is in fact a new species. This species appears to be found only in central and north-eastern areas of the Ethiopian region; I have seen specimens from Abyssinia, the Congo, and Kenya.

The grey faced form differs from the more common form in having a greater eye width to buccal width ratio, but the male genitalia are almost identical (Text-fig. 30).

Antennae totally black, some specimens show a slight lightening at the base of segment three. Arista with twelve to fourteen lateral hairs, face yellow with a prominent central carina, facial hairs long, sparse, and weak (Text-fig. 12). Parafacials and bucca yellowish grey to grey. Buccal and subequal posterior buccal bristles short but relatively strong. Frons heavily dusted with dark greenish brown pollen.

Thorax: with mesonotal vittae indistinct, often lacking, usually dark brown. Anterior edge of mesonotum, including the humeral callus with grey dusting. Pleura grey with a dark brown diagonal band from the humeral region to the mid pleurite.

Wings long and narrow with a slight diffuse infumation.

Legs: with all coxae and femora strongly grey dusted, fore tibia and last tarsal segments pale, but with heavy dusting, rest of legs pale. Only very slight darkening on the hind tibia.

Abdomen: median vitta not delimited, grey fasciae extending completely across the posterior half of the segments and expanding on the lateral edge.

ABYSSINIA: Woramboulchi, Serpent Lake, *c.* 9,000 ft., 22 ♂, 20♀, 5.x.1926 (*Omer-Cooper*).

KENYA: Aberdare Range, Mt. Kinangop, 9,000 ft., 6 ♂, 8 ♀, 1.x.1934 (*F. W. Edwards*).

CONGO: Ruanda, L. Karago, 284 ex., 21.iii.36 (*L. Lippens*); Ruanda, Gite de Nkuli, 92 ex., 17.iii.36 (*L. Lippens*); Kamogobe, (Sud Masisi) 5 ex., 4.iii.36 (*L. Lippens*); Terr. Rutshuru, 4 ex., 30.vii.37 (*Mission Prophylactique*); Kivu, Sake, 19 ex., 14.iii.36 (*L. Lippens*); Rutshuru, 2 ex., 28.v.36 (*L. Lippens*); Kivu, Kavimvira, 1 ex., xii.54 (*G. Marlier*), à la lumière; Lac Gardo, N. Kivu, 2 ex., xii.1925 (*Dr. H. Schouteden*); Kivo, Butembo, Nr. Ibina, 1 ex., 10.ii.50 (*G. Marlier*).

***Notiphila* (*Agrolimna*) *andrana* sp. n.**

(Text-fig. 35)

This species is very closely related to *Notiphila obscuricornis* Loew, but easily distinguished from it by the following: *totally* pale fore tibiae and hind tibiae, relatively strong facial series of weak bristles, pleura with buff region extending on to the sternopleuron. Brown abdominal fasciae not distinct, grading into the buff-grey posterior regions. Male epandrium sharply pointed ventrally (Text-fig. 35). Ventral hairs on fore femur less crowded.

♂. Antennae, segments I and II black, III dark dorsally and at apex. Nine lateral hairs to arista. Hairlike posterior buccal bristles, palpi bicoloured, yellow-white dorsally to orange ventrally. Median grey vitta just delimited by brown fasciae. Posterior buccal bristles weak. Extra small spine on segment II of antenna, larger spine short. Variable darkening of fore tibiae, some specimens showing considerable darkening.

Holotype ♂. MADAGASCAR: Centre, Lac Froid, 1,620 m., dct. Ambatolampy, 15.xii.57 (*B. Stuckenberg*).

Paratypes. 2 ♂, and 5 ♀, same data as type.

Holotype, 1 ♂ and 4 ♀ paratypes to N.M., 1 ♂ and 1 ♀ paratype to B.M.(N.H.).

Notiphila* (*Agrolimna*) *lineata Soika

(Text-figs. 4, 7, 34)

Notiphila lineata Soika, 1956*b* : 125.

A distinctive species obviously related to the members of the 'obscuricornis' group of species but easily distinguishable by means of the mesonotal pattern. At present known only from the Congo.

Head: antennal segments I and II black, segment III dark over apical half, pale basally, arista with thirteen lateral hairs. Face grey, carina darkened with brown over ventral half. Facial hairs numerous but weak, relatively long. Palpi pale yellow with six to eight long, weak hairs on the ventral surface. Buccae grey, buccal bristle weak, two long weak subequal posterior buccal bristles. Frons with grey para-orbital strips, fronto-orbital strips dark, when viewed at an angle to the light. Frons divided by a dark ocellar strip with white median line.

Thorax: mesonotum dark brown with two broad grey vittae passing laterally to the line of the dorsocentrals, the grey becomes brownish over the posterior half of the notum. Scutellum dark brown. Pleura totally grey.

Fore leg almost completely dark, only base of the tibia pale. Middle leg with the femur and the last tarsal segment dark, and the remainder pale. Hind leg with the femur, central one third of tibia and the last two tarsal segments dark.

Wings long with the membrane hyaline, veins dark brown and the hind cross vein strongly clouded.

Abdomen: narrow grey fasciae on segments three and four only, a broad median grey vitta on segments three, four and five, delimited along its length. Male genitalia as Text-figs. 4, 7, 34.

The above description was taken principally from the type, which is in very poor condition, having lost all the head bristles.

I have seen the following specimens:

CONGO: Kamogobe (Sud Masisi), 4 ♂, 10 ♀, 4.iii.36 (*L. Lippens*); N. Kivu, Lac Gardo, 1 ♂, 1 ♀, xii.25 (*H. Schouteden*).

***Notiphila* (*Agrolimna*) *montana* sp. n.**

(Text-fig. 29)

A small species, in external form very close to *Notiphila abdita* sp. n. but with totally different male epandrium (Text-fig. 29), the latter being distinctly pointed, not truncate with terminal lateral projections. The following description is based on a comparison between this species and *Notiphila abdita* sp. n.

♂. *Head:* antennae totally black, without trace of red at the base of the third segment. Nine lateral hairs to arista. Face grey with distinct golden yellow undertones. Facials set in a long high series, relatively strong and extending right back to the cheeks along the mouth edge. Para-orbital plate iridescent brown to black, no outstanding orbital bristle, and a very narrow golden strip along the frontal edge of the eye. Final bristle of the posterior orbital series long but weak, and directed medially, separated by the length of one bristle at the tip.

Thorax: mesonotum greenish brown with a distinct median brown vitta plus two pairs of distinct incomplete bands, on either side. Scutellum concolorous. Pleura grey, apart from dorsal half of the mesopleuron, which is dark brown.

Wings: hyaline, with veins brown and slightly infumated, more so on the posterior cross vein.

Legs: fore coxae silvered, rest of fore leg dark, apart from the knees and the base of the tibia. Middle femur and the last two tarsal segments dark, the rest pale. Hind femur, middle third of the tibia and the last two tarsal segments dark.

Abdomen: broad median vitta extending from the third segment, only just visible on the hind segment. Vitta delimited by the brown fasciae.

Holotype ♂. S. AFRICA: Basutoland, Maseru District, Bushmans Pass, Maloti Mts., 2,125–2,250 m., 8–14.i.1963 (*B. & P. Stuckenberg*).

Paratypes. 3 ♀ and 5 ♂, same data.

Type to the N.M., 1 ♀, 2 ♂ paratypes to the B.M.(N.H.).

Notiphila (Agrolimna) dimidiaticornis Soika

(Text-fig. 37)

Notiphila dimidiaticornis Soika, 1956 : 500.

A member of the 'obscuricornis' group of species, originally intended by the author to apply to all specimens of this form with pale third antennal segments. However, as the lectotype of *Notiphila obscuricornis* Loew also has the base of the third segment pale, *N. dimidiaticornis* is now restricted to those specimens possessing predominantly dark fore tibiae, some paleness around the base of the third antennal segment, male genitalia with the apex of the epandrium rounded (Text-fig. 37), and a rounded lateral process on the external claspers. Only recorded from the Congo and Uganda.

♂. Antennal segment I dark, II pale with heavy dark dusting, III predominantly pale but tip and dorsal edge dark. Arista with thirteen lateral hairs. Face silvery grey, slight darkening of the lower carina. Facial series of numerous, short and weak hairs. Palpi orange-yellow with three to four short bristles on ventral edge. Buccae grey, buccal bristle short but relatively strong. Para-orbital strip greyish white. Fronto-orbital strip paler brown than frons.

Thorax: ground colour pale greyish brown with a median vitta plus a series of longitudinal vittae passing through the notopleurals, supra-alars and dorsocentrals. The median vitta divides just anterior to the prescutellars and each fork widens on to the scutellum. Pleura grey with a rectangular brown patch on the mesopleuron.

Legs: all coxae strongly dusted with grey, trochanters pale and femora dark with grey dusting. Fore tibia pale over the basal half, tarsi dark. Middle tibia darkened slightly on the lower third, tarsi apart from the last two segments, pale. Hind tibia darkened only narrowly over third, last two tarsal segments dark.

Wings: with the hind cross vein only slightly darkened. veins brown.

Abdomen: median grey vitta delimited, but not constricted on the posterior edge of the fourth segment, narrow grey fasciae on the second to fifth segments. Grey vitta from either second or third segment and broader posteriorly.

Material studied. CONGO: Terr. Rutshuru, 30.vii.1937 (*Mission Prophylactique*); Ruanda, L. Karago, 15 ex., 21.iii.36 (*L. Lippens*); Terr. Rutshuru, 80 ex., 30.vii.37 (*Mission Prophylactique*); Ruanda, Gite de Nkuli, 25 ex., 17.iii.36 (*L. Lippens*); Kamogobe (Sud Masisi), 19 ex., 4.iii.36 (*L. Lippens*); Kivu, Marais Sasa

(Ngweshe), 1,300 m., 5 ex., 6.v.49 (*G. Marlier*); Rutshuru, Fuku, 24 ex., 15.v.36 (*L. Lippens*); Kasongo, 4 ex., viii.59 (*P. L. G. Benoit*); Urundi, Kitega, 16–1700 m., 2 ex., 3–4.iii.53 (*P. Basilewsky*); Uele, Gangala na Bodio, 14 ex., 14.v.36 (*L. Lippens*); Katanga, Elizabethville, 1 ex., 20.x.29 (*M. Bequart*); Rutshuru, 2 ex., ix–x.1936 (*Delville*); Kibati-Ituri, Kilomines, 1 ex., 24.iv.56 (*R. P. C. Smoor*); Elizabethville, 1 ex., 31.vii.32 (*De Loose*); Nyangwe, 1 ex., 25.iv.18 (*R. Mayne*); Urundi, Bururi, 1 ex., x.48 (*F. François*); Kivu, Butembo, riv. Kalengero, 1 ex., 8.ii.50 (*G. Marlier*).

Apart from the Congolese material I have seen the following: UGANDA: Katosi, 1 ♂, 1 ♀, 20.ix.1936 (*E. G. Gibbins*), ' On debris at edge of lake '; Ruwenzori Range, Kilembe, 4,500 ft., 3 ♂, (*F. W. Edwards*), B.M. E. Afr. Exp. xii.1934–i.1935.

The Uganda specimens are appreciably darker brown on the pleura, mesonotum and hind tibia.

***Notiphila* (*Agrolimna*) *kufena* sp. n.**

(Text-fig. 33)

In external appearance very like *Notiphila abdita* sp. n. but differing from it by the darkened facial carina, more obvious thoracic pattern and the male epandrium (Text-fig. 33). I believe this species to be much more closely related to *Notiphila lineata* Soika, from which it may be easily distinguished on mesonotal pattern alone.

♂. Antennae dark, with a pale area at the base of segment III. Twelve lateral hairs to arista, porrect spine on segment II short. Face grey to silvery, at an angle to the light, central carina lightly marked ventrally with brown. Facial hairs short and weak, parafacials shining silvery white. Buccae silver-grey, buccal bristle short and weak. Frons iridescent blackish brown. Para-orbital strip white, fronto-orbital strip appears darker than frons; no outstanding orbital bristle. Black velvet triangular area anterior to ocellar triangle, very elongate, extending to within half its length of frontal edge. Posterior orbital series of bristles very weak and short, the most dorsal member not elongate and inclinate.

Thorax: ground colour grey-green with a median brown vitta and a pair of brown vittae along the line of the dorsocentrals, the median line dividing just posterior of the second dorsocentral and coalescing with the lines through the dorsocentrals. A pair of lateral broader bands starting posterior to the grey humeral callosity and extending through the intra-alar bristles to the edge of the scutellum. Scutellum with two bands on the disc and darkened laterally with brown.

Wings hyaline but all veins infumated to some degree, the posterior cross vein most strongly.

Legs: fore coxae silver-grey with a few strong hairs, the rest of the fore leg dark, apart from the base of the tibia, which is testaceous yellow. Mid coxae pale, femur grey dusted, tibia and tarsi, apart from apical two segments, pale. Hind coxae pale, femur grey dusted, tibia with apical half, apart from extreme apex and last two tarsal segments, dark.

Abdomen: first and second visible segments almost totally dark brown, lateral edges of second segment grey. Median grey vitta narrow and delimited by brown fasciae, only just extending on to the third segment, constricted on posterior edge of the fourth, and appreciably wider on the fifth.

♀ with appreciably darker facial carina, the colouring often extending laterally to darken the complete lower face.

Holotype ♂. NIGERIA: Zaria, 10.iii.66 (*Lyall & Deeming*).

Paratypes. NIGERIA: Zaria, Kufena, reedy stream, 2 ♂, 2 ♀, 14.ii.66 (*Lyall*); Zaria, Kufena ponds, 1 ♀, 12.iii.66 (*J. C. Deeming*); Zaria, Samaru, 1 ♀, 25.v.66 (*J. C. Deeming*), Irrigation ditch.

Type, and 2 ♂, 2 ♀ paratypes to B.M.(N.H.).

***Notiphila* (*Agrolimna*) *bivittata* sp. n.**

(Text-fig. 14)

Very distinctive species which is easily distinguished from all others by means of the two broad, lateral, velvety black frontal bands, with a narrow blue-grey frontal region between, black antennae and golden yellow face.

♀. Antennae black, arista with ten lateral hairs, face strongly carinate, golden yellow; parafacialia and buccae grey. Facial series of five to six short weak hairs. Buccal bristle weak and sparsely scattered very short bristles on buccae. Eyes very large, cheeks narrow (Text-fig. 14). Lateral regions of frons and vertex velvety black, median third of frons bluish grey, yellowish anteriorly. Head bristles of normal complement and strength. Postocular bristle weak.

Mesonotum brown with a pair of extreme lateral grey vittae and a median pair of less distinct grey vittae. Posterior to the suture are an indistinct pair of grey-brown bifurcated vittae. Very sparse mesonotal setulae. Pleura, excepting brown dorsal half of mesopleuron, grey.

Legs: Femora grey dusted, tibiae dark, paler basally, especially on middle tibiae. Tarsi pale, fore tarsi with some dark dusting.

Wings with membrane hyaline, veins brown, halteres pale yellow.

Abdomen: brown fasciae on all segments, median grey vitta on segments three to five only, broadening posteriorly and strongly constricted on last three segments.

♂ unknown, but as sexual dimorphism is slight in this genus, should be determinable with key provided.

Holotype ♀. CONGO: Ruanda, Lac Mohasi, iv.1952 (*G. Marlier*), to I.R.S.N.

***Notiphila* (*Agrolimna*) *abdita* sp. n.**

(Text-fig. 32)

Small species, may be distinguished from the other members of the *obscuricornis* group by the following combination of characters. Antennae with the third segment pale at base, abdomen with a constricted narrow median vitta, face grey, indistinct, but visible thoracic vittae. Hind tibia very strongly darkened. Fore legs dark apart from tibial base. A little dark dusting on middle of mid tibia.

♂ and ♀. *Head:* antennal segments I and II dark, base of segment III pale orange-red, porrect spine short. Arista with ten lateral hairs. Face dull to silver-grey, carina strong. Facials short and weak, buccae grey, with buccal bristle about three times the length, and twice as strong, as the facials. Frons iridescent brown, para-orbital edge light brown-white, fronto-orbital plates lighter than frons. Last member of postorbital series short and inclinate but separated by more than the length of one bristle. Orbital bristles numerous, one stronger than the rest and proclinate.

Thorax: ground colour buff-brown with indistinct dark brown vittae, latter consisting of a median broader band and two pairs of lateral vittae, one along the line of the dorsocentrals and the other, interrupted, along the line of the intra-alars. Scutellum with a pair of indistinct vittae. Pleura buff-brown dorsally, grading to grey ventrally, brown mesopleural marking diffuse.

Wings hyaline, with slight infumation on the hind cross vein.

Legs: fore legs dark, apart from grey coxa and base of tibia, which is yellow. Femoral hairs long, equal to, or longer than, width of femur. Middle leg with femur grey dusted and last tarsal segments dark, remainder of leg pale. Hind leg, femur and all but base and apex of tibia, and last tarsal segments dark.

Abdomen: abdominal segment one brown, with lateral grey fasciae. Second segment grey on posterior edge and laterally. Grey vittae on segments three and four, very narrow and totally delimited. The grey fasciae surrounded by brown both anteriorly and posteriorly. Last segment brown medianly, and only grey laterally.

Genitalia ♂ distinctive, with two lateral terminal projections on the truncate tip of the epandrium (Text-fig. 32).

Holotype ♂. S. AFRICA: Natal, Ahrens District, Nr. Lilani, iv.1962 (*B. & P. Stuckenberg*).

Paratypes. RHODESIA: Zimbabwe, 1 ♂, 28.i.1955 (*B.R.S. & P.G.*); Umtali, Vumba, 3 ♂, 1 ♀, v.1932 (*L. Ogilvie*); Umtali, 2 ♀, ix.1927 (*A. Cuthbertson*). S. AFRICA: Port St. Johns, 1 ♀, 20–25.xi.1961 (*B. & P. Stuckenberg*); Griqualand East, Ayliff District, Insiswa Mt., 1 ♂, 1 ♀, xi.1961 (*B. & P. Stuckenberg*); Natal, Pinetown District, Gillits, 1 ex., 1.x.61 (*B. & P. Stuckenberg*); Natal, Drakensberg, Cathedral Peak Forestry Reserve, Little Berg Summits, Thereda Grasslands, 5,500–6,000 ft., 2 ♂, 3 ♀ (*B. & P. Stuckenberg*).

Holotype ♂ and ten paratypes to N.M., six paratypes to B.M.(N.H.).

I have also seen four further specimens from Cape Province which may belong to this species, differing in antennal colour, and reduced terminal projections on male epandrium.

***Notiphila* (*Agrolimna*) *ambata* sp. n.**

(Text-fig. 36)

A very small species, easily confused with *Notiphila abdita* sp. n., but distinguished from it by means of the less dark antennae, segment III basal half pale, and the wide, continuous abdominal vitta, not usually constricted by the brown fasciae into segments, plus the shiny silver-white face, almost totally unmarked.

♂ and ♀. A small species, 1·5–2·5 mm., appreciably smaller than the related mainland species *Notiphila abdita*.

Head: antennae with segments I and II dark, segment III dark at tip and on dorsal edge, dark reddish orange at base. Arista with eight lateral hairs. Face silver-grey to shining white to golden, central carina distinct and ventrally broad, facial series of hairs weak and short. Buccae grey, buccal bristle about twice as strong, and one and a half times as long, as the facial hairs. Frons iridescent green-brown with ocellar triangle and two fronto-orbital strips iridescent copper to black-brown, only the very slightest white line around dorsal aspect of eye. One small orbital bristle set close to the fronto-orbital. Palpi orange-yellow, with a number of hairs set into the ventral edge of external face.

Thorax: dark brown mesonotum with only slight suggestion of vittae, setulae scattered. When held at an angle to light, thorax appears distinctly greenish and brown vittae become apparent. Scutellum as mesonotum. Pleura dark brown, becoming buff-brown ventrally, metapleuron greyish brown.

Legs: fore legs almost totally dark, slight lightening around base of tibiae. Mid femur dark, tibia strongly dusted and tarsi paler, excepting last segment. Hind femur dark, tibia dark over apical half to two thirds, tarsi, apart from last segment, pale.

Wings: hyaline, veins dark, no strong bristles along the first costal section, only at the costal break.

Abdomen: from third segment brown fasciae delimit, but do not constrict, the median grey-green iridescent vitta.

Genitalia ♂. The tip of the epandrium is narrowly truncate with slight protruberances (Text-fig. 36).

Holotype ♂. MADAGASCAR: Tan., Tanarive, 1.ix.58 (*F. Keiser*). To N.M.B.

Paratypes. MADAGASCAR: Fia., Ambalamanakana, 5 ♀, 13.i.58 (*F. Keiser*); Centre, Lac Froid, 1,620 m., dct. Ambatolampy, 3 ♂, 2 ♀, 11–15.xii.57 (*B. Stuckenberg*); Centre, Moramanga, 1,000 m., 1 ♀, 18–24.xii.57 (*B. Stuckenberg*). N.M., N.M.B.

PARALIMNA Loew

Paralimna Loew, 1862*a* : 138.
Paralimna Loew; Loew, 1862*b* : 13.
Paralimna Loew; Cresson, 1916 : 102.
Paralimna Loew; Cresson, 1947 : 108.

Type-species, *P. appendiculata* Loew (mon.) =*punctipennis* Wiedemann.

The largest genus, in number of species, of the Ethiopian Ephydridae, comprising three distinct subgenera and thirty-seven species in seven species groups.

The genus may be distinguished by the following characters: Costal vein extending to the fourth longitudinal vein, two notopleural bristles, four pairs of dorsocentral bristles and numerous scattered setulae on the mesonotum. One sternopleural bristle present, and three erect strong dorsal bristles on the mid tibia. Frontal, fronto-orbital ocellar and vertical bristles usually well developed.

Far less homogeneous as a genus than *Notiphila* and consequently the species are more easily determined on such characters as facial shape, bristle number and arrangement, and male fore femoral armature. The two new subgenera differ considerably in form from the characteristic subgenus *Paralimna* but possess all the diagnostic characters of the genus, and I have preferred to retain them here.

The male genitalia may be used as diagnostic characters in grouping the species into subgenera and into the seven species groups. Considerable differences are noted between species groups, many of which I suspect are of a mechanical nature, rather than of phylogenetic significance, and related primarily to the size of the copulants. Male genitalia do not exhibit such obvious differences between closely related species as those of *Notiphila*.

The complete male genitalia are shown in Text-fig. 9, so that the position of the component sclerites may be noted, as hereafter only individual parts are figured.

A key to the species and subgenera is provided and it should be noted that *Paralimna nidor* Cresson, is keyed twice in separate sections of the key, due to the two distinct facial colour forms found in this species.

Key to the Ethiopian Subgenera and Species of *PARALIMNA*

1 Buccae and mesopleura totally silver dusted or abdomen grey and without fasciated pattern 2

– Buccae and mesopleura, at most, grey dusted, abdomen with a bicoloured fasciated pattern (Subgenus ***PARALIMNA*** Loew) (p. 324) 5

2 Two strong, subequal, posterior mesopleural bristles, eyes and buccae bulbous (Text-fig. 42), males may have a dark area in marginal cell of wing, abdomen not totally grey (Subgenus ***AFROLIMNA*** sgen. n.) (p.322) 3

– Only one strong mesopleural bristle, the dorsal bristle reduced, male may have dark facial dusting (Subgenus ***OEDENOPIFORMA*** sgen. n.) (p. 319) 4

3 Notopleuron silver dusted, abdomen without lateral silver stripes on segment II, wing of male immaculate ***carolinika*** sp. n. (p. 322)

– Notopleuron brown, abdomen with lateral silver stripe on segment II, wing of male with a dark patch in marginal and submarginal cells ***keiseri*** sp. n. (p. 323)

4 Face of female yellow, antennae greyish dusted, male unknown ***argentea*** sp. n. (p. 322)

– Face of female silver-grey, antennae dark brown, face and buccae of male dark velvety brown ***madecassa*** Soika (p. 321)

5 Pleura with horizontal brown vittae, third antennal segment more than twice as long as broad (Text-fig. 41) **(*limbata*-species grp.)** 6

– Pleura without horizontal brown vittae, third antennal segment invariably one and a half times as long as broad 7

6 Wings with hind cross-vein darkened (Pl. 1) ***limbata*** Loew (p. 326)

– Wings with brown reticulate pattern (Pl. 1) ***reticulata*** sp. n. (p. 327)

7 Facial profile consists of a vertical face, without a distinct carina but often with a protruding interfoveal region; frons and vertex horizontal, antennae inserted in line with the most dorsal region of eye (Text-fig. 44), usually large species **(*arabica*-species grp.)** 16

– Facial profile consists of a convex face, usually with a distinct carina; frons and vertex convex, antennae inserted in line with the middle region of eye (Text-fig. 40) 8

8 Anterior fronto-orbital angles velvety black, median section of anterior frons slightly raised. Posterior fronto-orbital bristle usually less well developed than anterior bristle, or even absent 9

– Not as above 23

9 Wings immaculate 10

– Wings maculated 12

10 Second antennal segment with a round, flattened white area on the dorsal surface, velvet-black frontal region bounded by a yellow mark but without a niveous pupil ***albonotata*** Loew (p. 351)

— Second antennal segment without such a round white area, velvety black area with a niveous pupil 11

11 Median, raised, anterior region of frons crenulate, small species ***basilewskyi*** Soika (p. 351)

— Median region not crenulate, larger species ***pupulata*** Cresson (p. 349)

12 Anterior fronto-orbital bristle weak, only a little stronger than posterior fronto-orbital bristle ***approximata*** Cresson (p. 349)

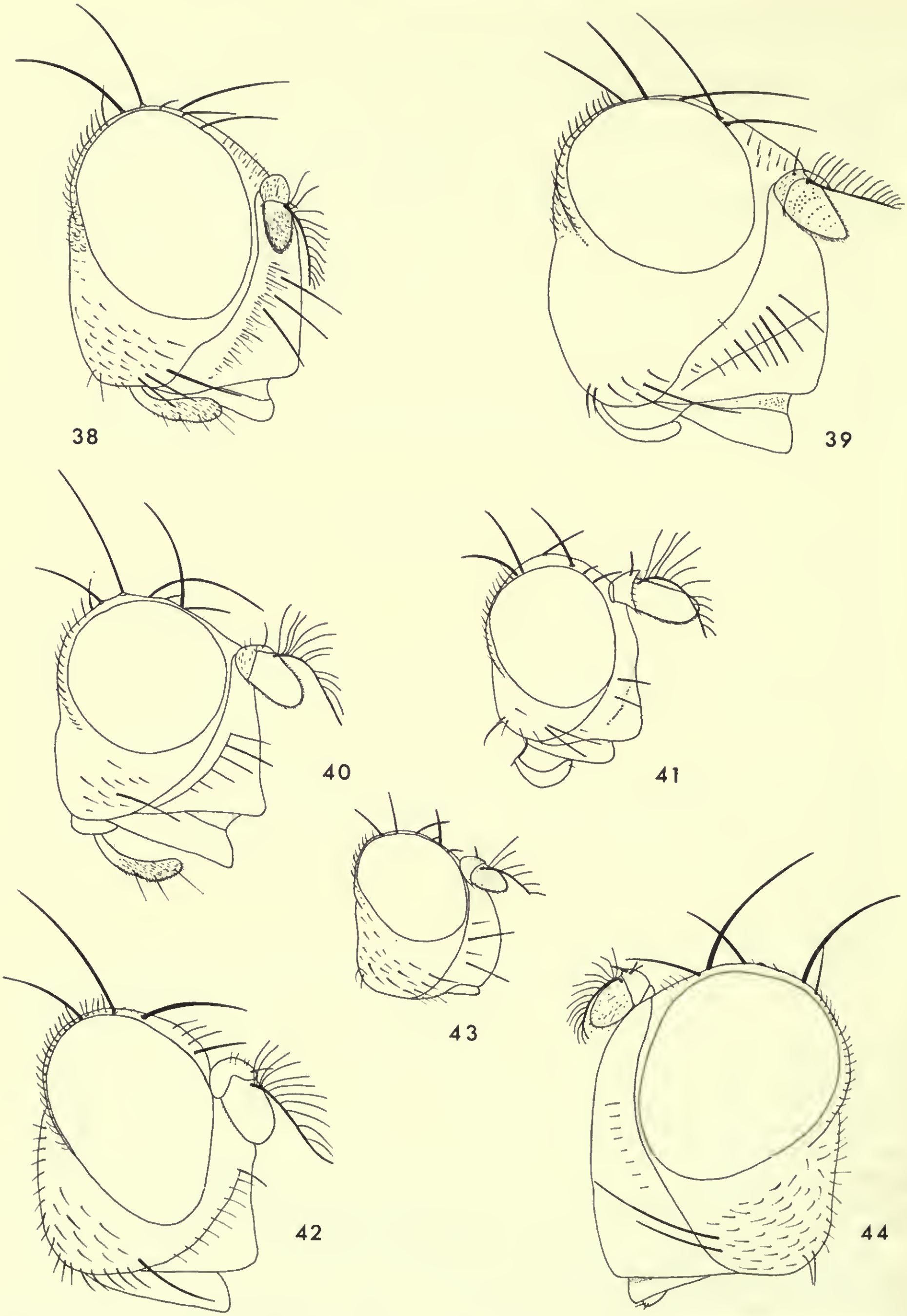
— Anterior fronto-orbital strong, and usually at least twice the length of the posterior 13

13 Marginal cell without any white areas of pattern, although second longitudinal vein may bear numerous infumated adventitious branches 15

— Marginal cell with patterning (Pl. 1, fig. 6) 14

14 Only cross-veins, including partial or complete adventitious cross-vein darkened (Plate 1, fig. 6) ***vansomereni*** Cresson (p. 347)

— Two cross-veins and numerous round patches in submarginal cell darkened (Pl. 1, fig. 5) ***cressoni*** sp. n. (p. 348)



Figs. 38–44. Heads of *Paralimna* spp.: 38, *Paralimna nigripes* Adams; 39, *P. albonotata* Loew; 40, *P. cressoni* sp. n.; 41, *P. reticulata* sp. n.; 42, *P. carolinika* sp. n.; 43, *P. madecassa* Soika; 44, *P. monstruosa* Soika.

15 Numerous adventitious veins present, either branches or complete cross-veins (Pl. 1, fig. 8) . . . . ***mackieae*** Cresson (p. 346)

— No adventitious veins, branches nor cross-veins . . . . ***confluens*** Loew (p. 345)

16 Facial bristles hairlike and porrect, face without a strong protuberance . . . 17

— Facial bristles with at least one strong member, usually partially reclinate, may possess a strong facial protuberance 18

17 Facials long, extending beyond the facial edge when viewed laterally, buccal bristle very long and slender, palpi and fore tibiae dark . . . . ***lynx*** Cresson (p. 343)

— Facials short and very weak, not extending beyond facial edge when viewed laterally, buccal bristles strong, tips of palpi and fore tibiae pale . ***monstruosa*** Soika (p. 342)

18 Buccae and sternopleura predominantly dark brown, females may have only the anterior edge of buccae brown 19

— Buccae and sternopleura predominantly grey 21

19 Face mainly grey, brown of buccae extending onto sides of ventral facial region, fore tibia paler than femur. Broad grey lateral vitta of mesonotum joining grey lateral areas of abdomen to produce a continuous lateral band, female only ***lamborni*** Cresson (p. 345)

— Face predominantly pale brown and without a grey lateral band on thorax and abdomen 20

20 Wings only infumated along edges of veins, at least lower half of face grey ***nebulosa*** Wirth (p. 343)

— Wings totally infumated, face and majority of pleura brown ***pokuma*** Cresson (p. 344)

21 Face pale brown, wings with darkening on apices of veins and hind cross-veins, darkened areas in apical third of costal and marginal cells, and below point of fusion of first long vein and costa . . . ***arabica ugandensis*** ssp. n. (p. 341)

— Face pale grey, wings may be infumated along veins 22

22 Cinereous species, vittation of mesonotum indistinct or absent, mesopleuron almost unmarked, abdominal pattern with brown fasciae reduced and margins between fasciae indistinct . . . . ***arabica arabica*** Becker (p. 340)

— Vittation of mesonotum more pronounced, median vittae well marked, mesopleuron with a central angular brown mark of varying size, abdomen with fasciated pattern well defined . . . . ***arabica nubifer*** Cresson (p. 341)

23 Buccae and pleura dark brown, fore femoral armature of male, if present, consisting of curved flat bristles 24

— Buccae and pleura predominantly grey, fore femora of male with numerous rows of closely set spinose setae or curved flat bristles 38

24 Ventral region of face grey, whitish grey or yellow 25

— Ventral region of face brown, or yellowish brown 33

25 Frontal bristle inserted lateral to, or anterior to, the anterior fronto-orbital bristle . 28

— Base of frontal bristle posterior to that of anterior fronto-orbital bristle . . 26

26 Frontal bristle situated well posterior of anterior fronto-orbital, very much nearer the posterior fronto-orbital 27

— Frontal bristle situated only just posterior to anterior fronto-orbital, face strongly convex and epistoma receding. Only eight flattened setae on male fore femora, all inserted over the apical quarter . . . . . ***sponsa*** Soika (p. 338)

27 Ocellar bristles of male cruciate, large species with buccae and lateral regions of face dark brown . . . . ***cruciata*** sp. n. (p. 333)

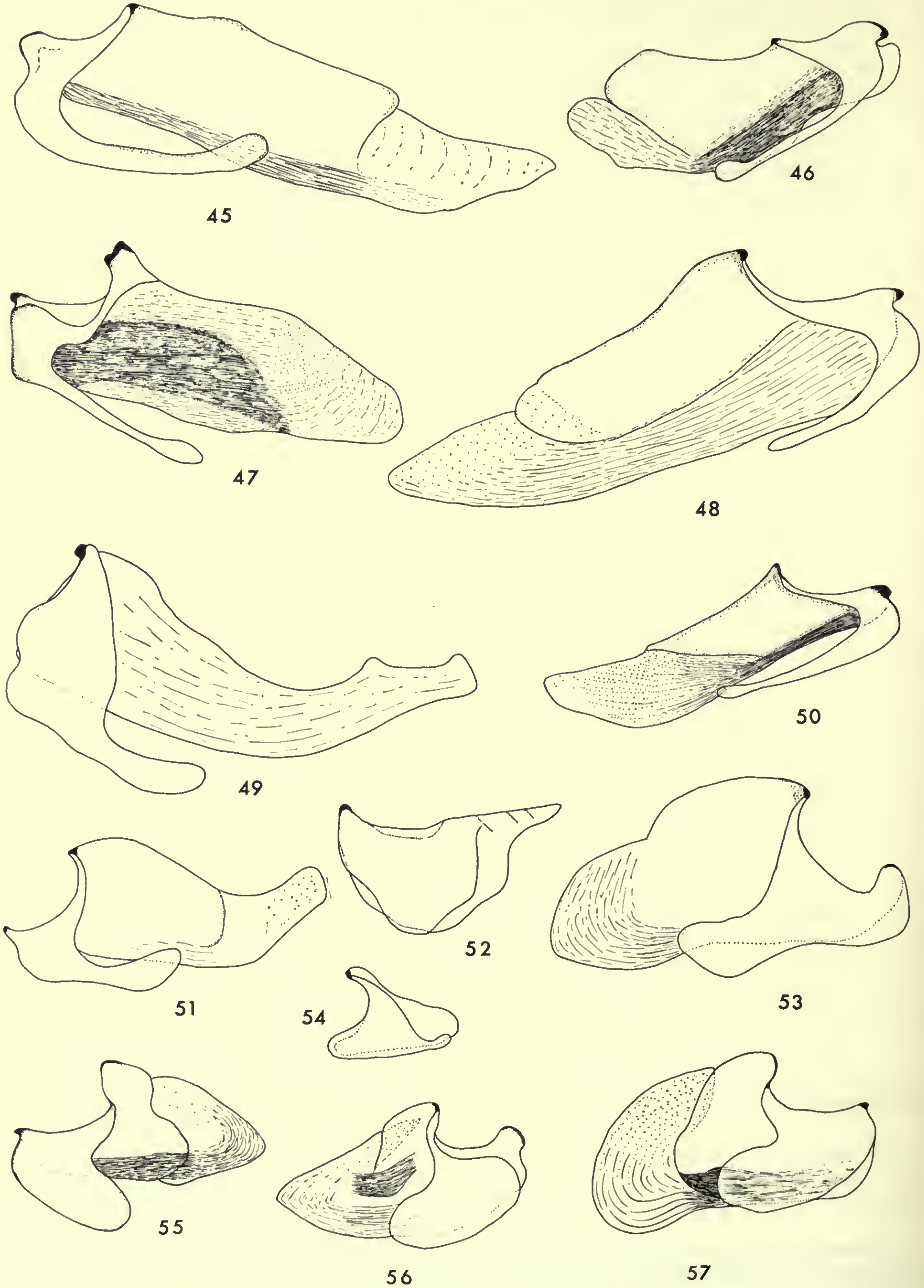
— Ocellar bristles of male proclinate; small species with buccae and lateral facial regions not totally brown . . . . ***adversa*** Cresson (p. 336)

28 Small species, less than 3 mm. in length; face very lightly dusted with grey ***insolida*** sp. n. (p. 335)

— Larger species, greater than 3 mm., face not lightly dusted with grey . . . 29

29 Brown of buccae extending on to lateral facial region 30

— Brown of buccae not extending on to lateral facial region 31



FIGS. 45–57. Aedeagus and parameres of *Paralimna* spp.: 45, *P. setifemur* Cresson; 46, *P. puncticollis* Becker; 47, *P. pokuma* Cresson; 48, *P. nebulosa* Wirth; 49, *P. albonotata* Loew; 50, *P. cruciata* sp. n.; 51, *P. pupulata* Cresson; 52, *P. reticulata* sp. n.; 53, *P. approximata* Cresson; 54, *P. aequalis* Cresson, 55, *P. vansomereni* Cresson; 56, *P. mackieae* Cresson; 57, *P. confluens* Loew.

30 Posterior fronto-orbital short, less than half length of anterior bristle (Text-fig. 38) ***nigripes*** Adams (p. 329)

— Posterior fronto-orbital long, almost as long as anterior fronto-orbital bristle ***mariae*** sp. n. (p. 333)

31 Facial series of two weak bristles, and three to four short hairs. Male fore femoral comb very reduced or absent 32

— Facial series of three to four usually strong bristles and four to five short hairs. Male fore femoral comb of ten to twelve short, curved, but not strongly flattened setae . . . . ***puncticollis*** Becker (p. 331)

32 Face yellowish grey, lateral mesonotal regions grey . . ***poecila*** Wirth (p. 332)

— Face only grey ventrally, mesonotum brown laterally . . . ***nidor*** Cresson (p. 337)

33 Reclinate frontal bristle posterior to anterior fronto-orbital; head and thorax may be unicolourous 34

— Reclinate frontal bristle lateral or anterior to the anterior fronto-orbital . . 36

34 Head and thorax generally unicolorous, often with dense golden brown dusting, abdomen with an indistinct fasciated pattern. Antennal segment III twice as long as broad . . . . ***aequalis*** Cresson (p. 325)

— Head and thorax with typical patterning, vittae and irrorations 35

35 Wings only very slightly infumated, lateral area of mesonotum grey ***invisa*** Soika (p. 337)

— Wings heavily infumated along the veins, whole insect very dark brown ***ustulata*** Wirth (p. 339)

36 Wings uniformly infumated, male fore femora unarmed . . ***nidor*** Cresson (p. 337)

— Wings, if infumated, darker along the veins, male fore femora armed . . . 37

37 Face totally dark brown . . . . ***dorina*** sp. n. (p. 334)

— Face yellowish brown, median dark vertical vitta on face, wings not infumated ***dorina rhodesiensis*** ssp. n. (p. 335)

38 Male with spinose setae on ventral surface of fore femora, female with spines or long hairs 39

— Male with a series of flattened setae on fore femora, female with short fine hairs . 40

39 Large, 4–6 mm. in length; facial carina and vertical median vitta reddish brown, two to three strong curved facial bristles. Male fore femora and tibiae spinose, posterior buccal region setulose. Female with sparse rows of short spinose bristles on fore femora . . . . ***setifemur*** Cresson (p. 330)

— Small species, 2–3 mm. in length, facial series of two to three short bristles face and buccae blue-grey. Male fore femora with numerous, less spinose more hairlike bristles on femur only. Posterior buccal region only setulose ventrally. Female with long ventral hairs on fore femora greater in length than width of femur ***wirthi*** sp. n. (p. 353)

40 Facial series with at least two strong bristles, anterior fronto-orbital lateral to frontal bristle, tarsi dark . . . . . . ***nigripes bona*** Cresson (p. 330)

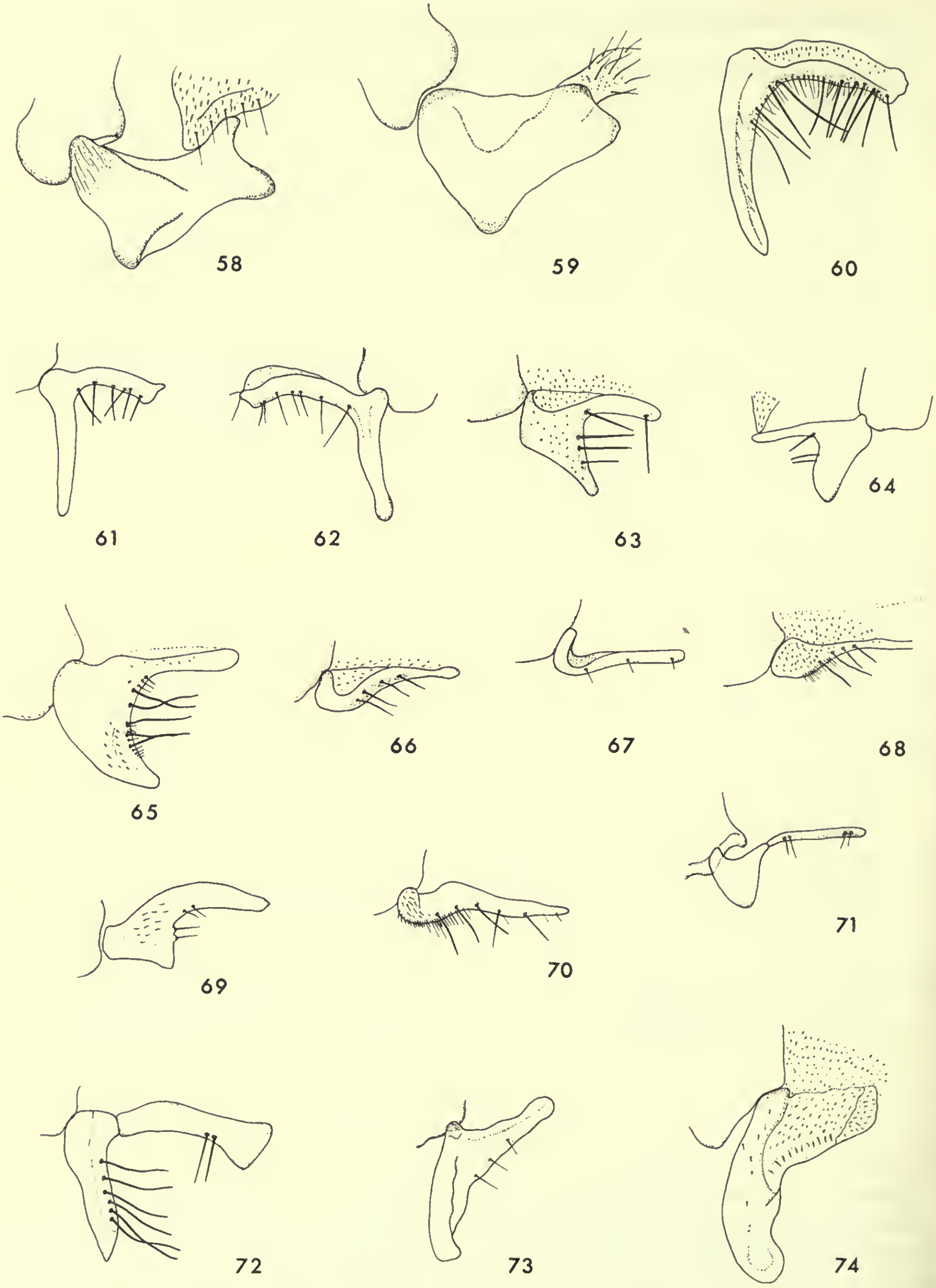
— Facial series of only one strong bristle, anterior fronto-orbital well in advance of the frontal bristle, tarsi pale . . . . . . ***uelensis*** sp. n. (p. 336)

Subgenus ***OEDENOPIFORMA*** sgen. n.

Type-species, *Paralimna madecassa* Soika, 1956.

Members of this subgenus are very similar in form to species of the genus *Oedenops* Becker, but are easily distinguished from them by the presence of sternopleural and presutural bristles and short but numerous mesonotal setulae.

The subgenus is characterized as follows: widely separated bristles of facial series, very pronounced sub-antennal area and extreme sexual dimorphism in facial colour. Fore



FIGS. 58–74. Single ♂ external claspers of *Paralimna* spp.: 58, *P. keiseri* sp. n.; 59, *P. carolinika* sp. n.; 60, *P. ustulata* Wirth; 61, *P. sponsa* Soika; 62, *P. nidor* Cresson; 63, *P. pupulata* Cresson; 64, *P. basilewskyi* Soika; 65, *P. approximata* Cresson; 66, *P. vansomereni* Cresson; 67, *P. confluens* Loew; 68, *P. mackieae* Cresson; 69, *P. wirthi* sp. n.; 70, *P. cressoni* sp. n.; 71, *P. aequalis* Cresson; 72, *P. albonotata* Loew; 73, *P. limbata* Loew; 74, *P. reticulata* sp. n.

femora with a row of short blunt spines on the anteroventral surface and the dorsal bristle of the posterior mesopleural pair greatly reduced. There is no fasciated abdominal pattern. The male genitalia are very reduced but the reduction is probably consistent with the small size of the copulants.

Only two species are so far recorded, one from Madagascar and the other from Northern Nigeria, the latter known only from the female. This subgenus may have arisen from a *Paralimna aequalis* Cresson type of ancestor and may eventually have given rise to the genus *Oedenops* Becker, in which the reduction of mesonotal setulae, mesopleural bristles and male genitalia is taken to conclusion.

Paralimna (Oedenopiforma) madecassa Soika

(Text-fig. 43)

Paralimna madecassa Soika, 1956*b* : 123 ♀.
Paralimna brunneifacies Soika, 1956*b* : 123 ♂.

The above synonymy is based only on the author's description as the types *Paralimna madecassa* and *Paralimna brunneifacies* Soika, have never been returned to Tervuren. Study of a series of this species collected by B. R. Stuckenberg in Madagascar convinces me that Soika wrongly sexed the brown faced males of *Paralimna madecassa* and consequently described them as a separate species. Male specimens are difficult to distinguish by an external study of the abdomen and require dissection for confirmation.

This species may be distinguished from *Paralimna argentea* sp. n. by means of facial colour, yellowish grey in the latter species, and the paler antennal colouring.

♀. *Head:* antennae black. Arista with seven to eight lateral hairs. Face grey, very pronounced. Facial series of two widely separated strong bristles (Text-fig. 43) and three to four short bristles on the ventral extension of the series. Buccae grey, darker posteriorly. Palpi black. Frons grey-brown dusted around ocellar region. Fronto-orbital bristles very small.

Thorax: silver-grey dusted, overlaid on mesonotum with pale brown and green. Grey laterally on mesonotum. Numerous short mesonotal setulae present. Scutellar colour as for mesonotum.

Legs predominantly grey dusted, tarsi pale. Fore femora with nine to ten short blunt spines on the antero-ventral surface.

Wings, hyaline membrane with pale brown veins. Halteres pale yellow on stem, head white.

Abdomen: silver-grey with light brown and green dusting over majority. Uniformly setulose.

♂. *Face*, buccae and lower frons a velvety blackish brown, differing only slightly from female in other respects. Fore femora with a series of long fine bristles on the postero-ventral surface.

Material studied. MADAGASCAR: Sud, Ampanihy, 250 m., 2 ♂, 7 ♀, 16–18.ii.58 (*B. Stuckenberg*); Sud, Fenerive, Lagoon Shore, 3 ♂, 2 ♀, xii.1955 (*B. Stuckenberg*); Centre, Station Agric. Alaotra, 800 m., dct. Ambatondrazaka, 1 ♂, 1 ♀, 24.xii.57 (*B. Stuckenberg*); Ouest, Ranohira, 860 m., 4 ♀, 26.i–4.ii.58 (*B. Stuckenberg*); Sud-Ouest, Saint Augustin, 6 m., dct. Tulear, 1 ♂, 11–13.ii.58 (*B. Stuckenberg*).

***Paralimna* (*Oedenopiforma*) *argentea* sp. n.**

Only one specimen of this most distinctive species, *Oedenops*-like in colouring but definitely a *Paralimna*, of the new subgenus *Oedenopiforma.* Easily distinguished from the other species of this subgenus *Paralimna madecassa* Soika, by the yellow face and greyish black antenna.

Head: antennal segments I and II dark, III with a pale pile, bristles on segment II very weak. Arista with seven to eight lateral hairs, latter short. Face a golden yellow with a very prominent carina. Two strong pairs of facials, as strong as frontal bristles plus three to four short hairs. Buccal bristle and setulae very short with relatively broad silver buccae. Frons buff-brown with only the slightest of dark gold-brown dusting. Postocular bristles minute.

Thorax: mesonotum buff-brown with the light golden brown dusting, this colouring extending onto the dorsal half of the mesopleuron. Rest of pleura grey. Scutellum of same colour as mesonotum.

Legs: fore legs dark grey dusted, except tarsi which are pale basally, becoming darker on apical segments. Fore femur has a row of very short close-set spines on the anteroventral face (cf. *Notiphila*). Middle and hind legs of a similar colouration to fore legs, hind tarsi paler than on anterior limbs.

Wings, membrane hyaline, veins pale yellow, first costal section with short spines on basal half. Halteres pale yellow on stem, white club.

Abdomen: totally silver dusted, only the faintest brownish tinge to the median area of segment two.

Small species, length of body 2 mm.

Holotype ♀. NIGERIA: Ilorin, 22.ii.1912 (*J. W. Scott-Macfie*) to B.M.(N.H.).

Subgenus ***AFROLIMNA* sgen. n.**

Type-species, *Paralimna carolinika* sp. n.

A most distinctive subgenus containing two species, *Paralimna carolinika*, confined to the African mainland, and *Paralimna keiseri* sp. n., found only on Madagascar.

The following characters will distinguish this subgenus: Face, buccae, mesopleura, and tibiae silver dusted, face and buccae rounded and bulbous. Eyes elliptical, bulbous, large in relation to size of head. Head cubiform, with short wide flattened carina separating antennae. Thorax without distinct vittae, pleura covered in a short pile. Scutellum laterally silvered at base. Abdomen without bicoloured fasciated pattern.

♂ genitalia very distinctive, external claspers very heavy (Text-fig. 58), not slender as in subgenus *Paralimna.* Aedeagus of *Paralimna* type but lateral claspers not fused dorsally, nor to each other.

***Paralimna* (*Afrolimna*) *carolinika* sp. n.**

(Text-figs. 42, 59)

Easily distinguished from the other species in this subgenus, *Paralimna keiseri* sp. n., by the silver notopleuron and lack of brown wing markings in the male.

♂ and ♀. *Head:* (Text-fig. 42) antenna black, segment III with pale pubescence. Arista with fourteen lateral hairs. Face and epistoma silver-grey, facial carina large, flattened and truncate, lightly dusted with yellowish grey and with a dark ' shadow ', due to reduced density of silver-grey pollen, below the carina, almost reaching the mouth edge. Facial series of one long weak seta and numerous short weak setae. Fronto-orbital angles velvety black, with a silver-grey area, bluish when viewed at an angle, on the inner edge. Two fronto-orbitals present, anterior twice as strong as posterior. Frons and vertex black, very lightly dusted with silver-grey. Labium and palpi brown, lightly silver dusted. Buccae silver dusted and bulbous and with a ventral fringe of long setae as well as the larger porrect bristle.

Thorax: blackish brown, lightened by a golden brown, dusting, the latter more dense and imparting a golden yellow colouration to the posterior edge of the mesonotum and the anterior portion of the scutellum. Darker areas of mesonotum with short black setulae. Notopleuron and mesopleuron silver-grey, dorsal sides of notopleuron edged in golden brown. Scutellum with area enclosed by bristles, both dorsally and laterally chocolate-brown, dusted lightly with gold, basal region silvered laterally. Pleura dark brown, excepting silver mesopleuron and golden sternopleuron.

Legs: coxae, femora and tibiae blackish brown dusted with silver, tarsi reddish yellow. Apical segments darker than basal. Fore femora with four posteroventral strong bristles.

Wing membrane hyaline with pale reddish yellow veins. Halteres, stem reddish yellow, club yellow.

Abdomen: covered in olivaceous grey pollen, anterior lateral edges of all tergites with slight brown areas, normal fasciated pattern absent. Silvered laterally on third and fourth segments in male, fourth and fifth in female. In male, fifth segment distinctly darker than preceding segments.

♂ genitalia (Text-fig. 59).

Holotype ♂. RHODESIA: Lower Lundi River, Chipinda pools, 22.x.60 (*R. Goodier*). B.M.(N.H.).

Paratypes. Data as type, 3 ♀; NIGERIA: Zungeru, 2 ♀, 19.iii.1911 (*J. W. S. Macfie*).

SUDAN: Yirol, 1 ♂, 28.ii.1954 (*E. T. M. Reid*). The above specimen from the Sudan has the golden dusting of the thorax in three distinct bands but differs in no other way. This species has a very wide range from Sudan in the North to Rhodesia in the South and extending westwards to Nigeria.

***Paralimna* (*Afrolimna*) *keiseri* sp. n.**

One of the two colourful and interesting members of the subgenus *Afrolimna*; like the mainland species the face and mesopleuron are silver, but the pleural stripe does not extend on to the mesonotum. In the male of this species the wing is strongly marked with brown.

♂. *Head:* antennae black. Arista with thirteen lateral hairs. Face strongly silvered, region around prominent, squarish upper facial carina not as strongly dusted and therefore darker. One strong facial bristle and about eight weak hairs. Lower facial region, below eye, brown dusted. Buccae silver with a pair of strong, subequal bristles plus numerous long forwardly directed hairlike bristles. One long posterior buccal bristle. Eyes bulbous, elliptical and large, cheeks relatively narrow. Vertex more sunken than usual. Velvet black irregular area around base of fronto-orbital. Frons shiny black with light dusting. A strong orbital bristle, just posterior to fronto-orbital. Frons and vertex region reduced in area.

Thorax: mesonotum black-brown with light golden brown dusting. Postnotopleural depression strongly golden dusted and two areas in scapular region grey dusted. Tip and dorsal surface of scutellum as notum, laterally, at base, silvered. Pleura grey, apart from mesopleuron which is brown in anterodorsal region and silver dusted over remainder.

Legs: fore legs grey with strong silver dusting. Femur with a posteroventral series of five or six long bristles, twice the width of the femur in length. Middle and hind legs dark with middle tibia strongly silvered on dorsal face, along complete length. Hind tibia not silvered on apical quarter, which is black. Middle femur with an apical anterior series of four to five strong bristles.

Wing: hyaline membrane, dark brown veins, an irregular brown patch just apical of midway in marginal and submarginal cells and extending as a diffuse brown mark into first posterior cell. Halteres dark at base, pale yellow on stem and club.

Abdomen: segment one dark brown, segment two with central two thirds greenish grey dusted and lateral edges silver, segment three as for two, but with anterior half of segment dark brown. Segment four same as three. Segment five dark brown.

♂ genitalia (Text-fig. 58).

Body length 4·5 mm.

♀. Wings lack brown patch.

Holotype ♂. MADAGASCAR: Sud, Sept-Lacs, 100 m., dct. Tuléar, 13–16.ii.58 (*B. Stuckenberg*). To N.M.

Paratypes. MADAGASCAR: Tan. Fenerive, 1 ♂, 4.xi.57 (*F. Keiser*); Sud, Sept-Lacs, 100 m., dct. Tuléar, 8 ♂, 10 ♀, 13–16.ii.58 (*B. Stuckenberg*); Centre, Station Agric. Alaotra, 800 m., dct. Ambatondrazaka, 1 ♂, 24.xii.57 (*B. Stuckenberg*); Ankavandra, Mamambolo, 2 ♀, vii.49 (*R.P.*), Inst. Sc. Mad.

The specimen from central Madagascar, although a ♂, has very reduced brown wing markings.

4 ♀ and 3 ♂ to B.M.(N.H.).

Subgenus ***PARALIMNA*** **s. str.**

Paralimna Loew; Cresson, 1916 : 105.
Poecilothorax Becker; Cresson, 1929 : 187.
Paralimna Loew; Cresson, 1947 : 108.

The nominal subgenus of genus *Paralimna*, very diverse in form and easily divisible into seven distinct species groups. The characters given for the genus, plus the presence of a fasciated abdominal pattern will suffice in distinguishing members of this subgenus. The subgenera *Afrolimna* subgen n. and *Oedenopiforma* subgen. n. are distinguished from it by lack of abdominal pattern and predominantly silver-grey buccae and mesopleura.

The male genitalia, although basically similar, differs markedly in the shape and degree of development of the component sclerites. The complete genital armature is figured (Text-fig. 9).

The *LIMBATA*-species group

Consists of three species in the Ethiopian region *Paralimna limbata* Loew, *Paralimna reticulata* sp. n. and *Paralimna aequalis* Cresson.

Head rather cubiform, face short with longitudinal shallow ridges and fronto-orbital bristles reduced. The third antennal segment is at least twice as long as broad. Originally designated as the subgenus *Phaiosterna* Cresson.

Paralimna* (*Paralimna*) *aequalis Cresson

(Text-figs. 41, 54)

Paralimna aequalis Cresson, 1929 : 193.
Paralimna aequalis Cresson; Cresson, 1948 : 10.
Paralimna vidua Soika, 1956*b* : 124, **syn. n.**

This species is very variable in colour, ranging from a light olive green through golden brown to dark blackish brown, but is instantly recognizable by the almost unicolourous vestiture of the head and thorax, characteristic head shape (Text-fig. 41), and the indistinct abdominal fasciated pattern.

Cresson placed this species in a separate subgenus *Phaiosterna* together with *Paralimna limbata* and *Paralimna decipiens* Loew. However, I have not followed this course, preferring instead to retain them in a separate species group.

The synonymy of *Paralimna vidua* Soika, is based upon a study of the type material from the Congo. Lamb's reference to *Paralimna lineata* Meij. from the Seychelles is probably correct, and *Paralimna aequalis* is a synonym of *Paralimna lineata* de Meijere, but I do not wish to state this synonymy at present.

♂. *Head:* antennae dark with some pale pubescence. Arista with seven to nine lateral hairs, segment III of antenna twice as long as wide and distinctly angular. Facial series of one to two long, and a variable series of shorter bristles together with a number of hairs. Facial carina slight, and lower face with slight horizontal indentations. One long buccal bristle and numerous hairs. The anterior fronto-orbital is inserted anterior to the frontal bristle.

Thorax: acrostichals in distinct, but irregular rows, wings with hyaline membrane and pale brown veins, and fore femora with a posteroventral series of short bristles along its length.

Abdomen: very indistinct pattern of dark brown and olive-grey; on segment two, narrowly, and segment five, broadly, are the grey fasciae complete.

♂ genitalia (Text-fig. 54).

♀ as for ♂, but on abdomen brown fasciae broader and grey interrupted on all segments.

Colouring varies according to region; West Africa, almost totally olivaceous; Congo, brown ochraceous; East Africa and Madagascar, more distinct frontal pattern with golden dusting on head and mesonotum. The specimens from the Aden Protectorate show a narrow median brown vitta on the mesonotum.

As I can detect no consistent genitalic differences I am considering all the colour varieties mentioned above as regional races. I have seen specimens from West Africa, the Congo, Madagascar and Seychelles, Sudan, Arabian Peninsula and Palestine, as well as from the Orient.

Material studied. MADAGASCAR: Sud-Ouest, Saint Augustin, 6 m., dct. Tuléar, 4 ♂, 6 ♀, 11–13.xi.58 (*B. Stuckenberg*); Nord, Diégo Suarez, 30 m., 2 ♂, 2 ♀, 4–9.xii.57 (*B. Stuckenberg*); Est, Ivontaka 15 m., dct. Mananara, 2 ♀, 10–14.iii.58 (*B. Stuckenberg*). Bas Mangoky, Station Agric., 1 ♀, Inst. Sc. Mad. GHANA: Neawani, 2 ♂, 8 ♀, 29.ix.21 (*J. W. Scott-Macfie*); Ashanti, Obuasi, 1 ♂, 3.iv.06 (*W. H. Graham*). SEYCHELLES IS: Mahé, 4 ♂, 08–9 (*J. S. Gardiner*); Lousin Is., 2 ♂, 2 ♀, 30.iii.52 (*E. S. Brown*). W. ADEN PROTECTORATE: Kirsh, *c.* 3,000 ft., 3♂, 3 ♀, 22.iii.1940 (*P. W. R. Petrie*) ' on camel near water holes '. CONGO: Kivu, Kavimvira (Uvira), 2 ♀, ii, iii.55 (*G. Marlier*), à la lumière, I.R.S.A.C.

***Paralimna* (*Paralimna*) *limbata* Loew**

(Pl. 1, fig. 1, Text-fig. 73)

Paralimna limbata Loew, 1862 : 13.
Paralimna limbata Loew; Cresson, 1929 : 188.
Paralimna limbata Loew; Cresson, 1947 : 115.
Paralimna limbata Loew; Soika, 1956*a* : 495.

In colour and form very similar to *Paralimna reticulata* but easily distinguished from it by the absence of wing pattern and black fronto-vertical patches. Cresson appeared confused over his conception of this species, referring to it as almost unicolourous in the same paper as describing the well marked throacic and frontal vittae (Cresson, 1947).

Head: antennal segments I and II dark, III buff-brown, twice as long as wide. Arista with eleven to thirteen lateral hairs. Face pale yellow to olive, with variable brown markings, facial series of one stronger bristle and one short weak bristle. Buccae with two strong subequal bristles both stronger than the facials, only three to four short bristles on buccae. Frons ochraceous with a broad median longitudinal vitta, purplish brown in colour and two short vittae extending from vertex to fronto-orbitals along orbital edge of same colour.

Thorax: mesonotum buff to olive-brown with a broad median vitta, plus three pairs of narrower vittae all of purplish brown. Mesopleura with two narrow vittae of similar colour to those on mesonotum. Rest of pleura grey-green. Scutellum with one central vitta.

Legs: tarsi pale, otherwise legs dark greyish brown. No male fore femoral comb.

Wings, with membrane hyaline, veins dark brown, hind cross vein clouded (Pl. 1, fig. 1).

Abdomen: grey fascia interrupted by median brown vitta on all segments but segment two in the male, on all segments in the female. Pattern of grey and brown fasciae less distinct in this species. Some specimens have the frontal and pleural vittae reduced and the wing veins slightly clouded along their lengths. They appear to differ in no other way. External claspers as Text-figure 73.

CAMEROONS: Kumbu, 5 ♂, 8 ♀, 6.x.49 (*H. Oldroyd*). UGANDA: Katosi, 3 ♂, 20.ix.36 (*E. G. Gibbins*), on debris at lake edge. ZAMBIA: Nr. Monze, x.1959. S. AFRICA: Pondoland, Port St. Johns, 1 ♀, v.1924 (*R. E. Turner*). SUDAN: Yirol, 1 ♂, 28.iii.54 (*E. T. M. Reid*). GHANA: Koforidua, 1 ♂, 2 ♀, 5.vii.1919 (*F. H. Storey*). MOZAMBIQUE: Lower Zambesi River, Marraneu, 1 ♀, xi.1957 (*P. J. Usher*); Lower Zambesi River, Luabo, 1 ♀, iv.1958 (*P. J. Usher*); Lower Zambesi River, Luabo, 1 ♂, i.1956 (*P. J. Usher*); Chupanga, Salowe Forest, 1 ♂, i.1956 (*P. J. Usher*).

LIBERIA: Cape Mount Co. Dia, 2 ♂, 3 ♀, 2.17.53,–25, Sandy bank (*C. Blickenstaff*). ETHIOPIA: Gila River Mission Station, 1 ♀, ix.1963 (*M. L. Schmidt*). CONGO: Plaine Herbeuse près de Mwashia, 1 km. de la saline, 1 ♂, 1 ♀, 3.v.39 (*H. J. Bredo*). I.R.S.N.; Elizabethville, 1 ♀, 30.iii.39 (*H. J. Bredo*); à la lumière, I.R.S.N.; Liberge, Savane Liki-Bembe, 1 ♀, 27.ii.48 (*R. Cremer, M. Neuman*), I.R.S.N.; Eaja, 1 ♂, vii.1935 (*J. Ghesquière*). I.R.S.N.

In the specimens from Mozambique and Luabo (i.1956), the wings are almost totally infumated, with pale areas around the costal rim and in the discal and second posterior cell. This rather distinctive form may represent a distinct subspecies but I refrain from describing it as such until further material can be obtained.

***Paralimna* (*Paralimna*) *reticulata* sp. n.**

(Pl. 1, fig. 2, Text-figs. 41, 52)

One of the most outstanding and easily distinguishable species in the genus, belonging to the *limbata* group. The body pattern of this species is very similar to that of *Paralimna limbata* but *P. reticulata* differs most strikingly in wing and head markings. There is far more brown on the abdomen than in *Paralimna limbata*, where at least half the tergite is fasciated.

♂ and ♀. *Head:* antennal segments I and II pale, with light grey dusting, segment III more than twice as long as broad, pale with dorsal darkening, at point of insertion into II, a distinct pale mauve shine. Arista with eleven lateral rays. Face short, golden dusted with slight lateral groove at ventral third. Brown patches on lower half of face. A single long curved facial bristle. Cheeks and parafacials grey, buccae dark brown. Buccal bristle long and slender and long subequal bristle and several short hairs. Epistoma gold dusted and receding. Frons ' golden ' yellow-brown with velvety texture, two iridescent patches, (turquoise-blue to dark purple, depending on angle of observation) on anterior edge of frons plus two velvet black rectangular patches, between main fronto-orbital and vertical bristles. Head bristles normal, second small anterior fronto-orbital. Eyes large and bulbous.

Thorax: notum, pleura and scutellum all dark reddish brown with one median, and two lateral pairs of dark golden vittae on the mesonotum, and three longitudinal vittae on the pleura. Dorsal and ventral broad vittae and a median, more indistinct, narrower band passing along the base of the mesopleural sclerite.

Legs, except for the tarsi and the apex of the fore tibia, dark blackish brown. Fore tarsal segments one and two pale orange-yellow, plus metatarsi on other legs, rest dark brown. Setulation normal. Hind metatarsus with strong yellow scopa.

Wings, dark veins bordered completely by brown shadowing, and all cells with brown patches; (Pl. 1, fig. 2). Halteres pale yellow, base darker.

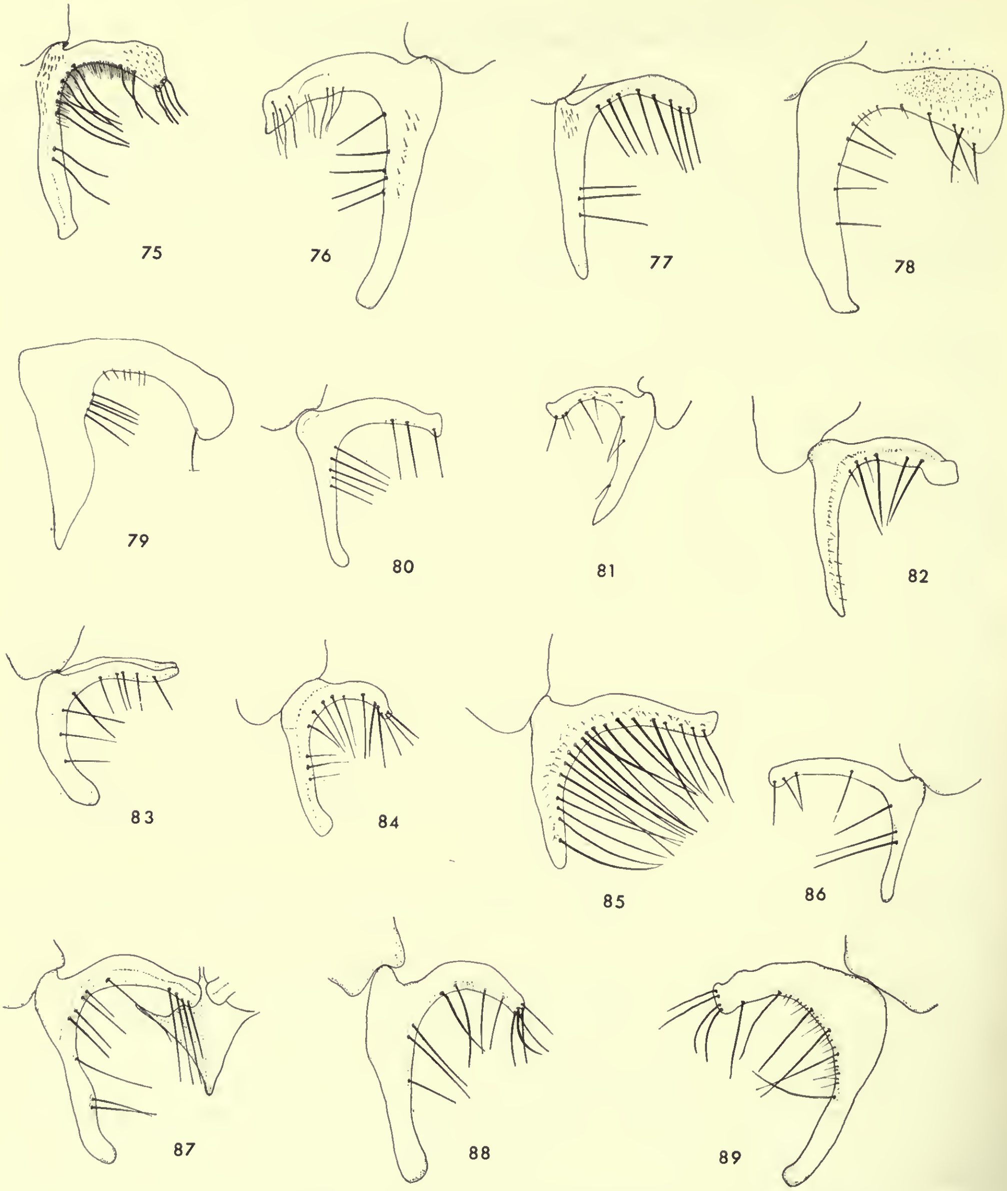
Abdomen: dark brown with yellow fasciae laterally and extending on posterior third of each tergite over only one third width of the segment.

Holotype ♂. MADAGASCAR: Ouest, Ranoshira 860 m., 26.i.–4.ii.58 (*B. Stuckenberg*). To N.M.

Paratypes. MADAGASCAR: Andobo, 190 m., Forêt Antsingy, dct. Antsalova, 3 ♀, 2 ♂, ii.57 (*P. Griv.*), Inst. Scientifique Mad.; Ranomafana, Ifanadiana, 1 ♂, Institut Scientifique Madagascar; Est, Ivontaka 15 m., dct. Mananara, 1 ♂, 10–14. iii.58 (*B. Stuckenberg*); Est, Ambodivoangy, 20 m., dct. Maroantsetra, 3 ♂, 16–20. iii.58 (*B. Stuckenberg*); Sambirano, Lokobe, Nossi-Bé, 1 ♀, 9–23.xi.57 (*B. Stuckenberg*); Ouest, Ranohira, 860 m., 7 ♂, 17 ♀, 26.i.–4.ii.58 (*B. Stuckenberg*); Maj. Amboromalandy, 1 ♂, 5 ♀, 2.vii.58 (*F. Keiser*); Maj. Amborovy, 1 ♂, 6 ♀, 30.vi.58 (*F. Keiser*); Maj. Amborovy, 1 ♂, 2 ♀, 29.vi.58 (*F. Keiser*).

The *NIGRIPES*-species group

Face wide in relation to depth and usually with strong facial bristle series. Male fore femoral armature strong.



FIGS. 75–89. Single ♂ external claspers of *Paralimna* spp.: 75, *P. pokuma* Cresson; 76, *P. monstruosa* Soika; 77, *P. nebulosa* Wirth; 78, *P. arabica nubifer* Cresson; 79, *P. arabica ugandensis* subsp. n.; 80, *P. lynx* Cresson; 81, *P. poecila* Wirth; 82, *P. puncticollis* Becker; 83, *P. invisa* Soika; 84, *P. cruciata* sp. n.; 85, *P. dorina* sp. n.; 86, *P. adversa* Cresson; 87, *P. nigripes* Adams; 88, *P. setifemur* Cresson; 89, *P. mariae* sp. n.

Paralimna (Paralimna) nigripes Adams

(Text-figs. 38, 87)

Paralimna nigripes Adams, 1905 : 178.
Paralimna nigripes Adams; Bezzi, 1914 : 307.
Paralimna nigripes Adams; Cresson 1929 : 186.
Paralimna nigripes Adams; Cresson, 1947 : 108.
Paralimna nigripes Adams; Wirth, 1956 : 384.
Paralimna nigripes Adams; Soika, 1956 : 492.

Similar in colouring and form to *Paralimna setifemur* and *Paralimna puncticollis* but darker than the latter, with male fore femora strongly ' combed '. *Paralimna setifemur* has characteristic male fore femoral setae and pale mesopleurae. Closely related to *Paralimna cruciata* sp. n. and *Paralimna mariae* but easily distinguished from both by facial colouration.

Head: antennal segments I and II dark, segment III with short grey and long sparse pale pubescence. Arista with ten lateral hairs. Dorsal face dark brown between antennae, lightening ventrally, becoming grey on lower half. Two to three strong facials plus a number of weak setae, buccae pale brown, darker just ventral to the eye, two strong porrect buccal bristles, numerous short setae. Frons dark brown with sparse golden brown patterning. Median vertical stripe often present.

Thorax: mesonotal ground-colour pale brown, heavily darkened with brown laterally. Scutellum of similar colouration. Pleura dark brown, except metapleuron which has some grey dusting.

All legs dark, fore femora of male with a long series of strongly flattened and curved setae, fourteen in number.

Wing membrane hyaline, slightly infumated along costa, more so in marginal and submarginal cells.

Abdomen: grey fasciae divided by median dark brown vitta on all segments but segment two. No darkening of posterior two segments in male. Male genitalia, large and heavily chitinized (Text-fig. 87).

A very common species, I have seen specimens from Nigeria, Congo, Kenya and South Africa.

From the original co-typic series of 10 specimens I have designated the following male specimen as LECTOTYPE.

LECTOTYPE ♂. S. AFRICA: Salisbury, 5050 ft., vi.1900 (*F. L. Snow*).

Paralectotypes, data as for Lectotype, 3 ♂, 6 ♀. All types have been returned to the University of Kansas, Lawrence, Kansas.

Material studied. SOUTH AFRICA: Natal, Weenen, 6 ♂, 20 ♀, xii.1923 (*H. P. Thomasset*); Natal, Weenen, 2 ♂, 4 ♀, iii.1925 (*H. P. Thomasset*); Natal, Muden, 1 ♂, 2 ♀, 1.x.56 (*B. Stuckenberg*); Pretoria, 1 ♀, vi.48 (*W. P.*); Port St. Johns, Pondoland, 1 ♀, 18–31.iii.1924 (*R. E. Turner*); Natal, Ndwedwe Dist. Montebello Region, 5 ♂, 4 ♀, 1.x.61 (*B. & P. Stuckenberg*); Natal, Drakensberg, Giants Castle Res., 2 ♀, 18–23.ix.61 (*B. & P. Stuckenberg*). KENYA: Nairobi, 1 ♂, vii.1930 (*Van Someren*); Mdagathi, 1 ♂, iv.33 (*Van Someren*); Ngong, 1 ♂, viii.48 (*Van Someren*); Nyerei (S), 1 ♂, x.48 (*Van Someren*). RHODESIA: Umtali, 3 ♀, ix.27 (*A. Cuthbertson*). ZAMBIA: Chilanga, 1 ♀, 21.v.13 (*R. C. Wood*), on wet ground by stream.

UGANDA: Katosi, 1 ♀, 20.ix.1936 (*E. G. Gibbins*), on debris at edge of lake. NIGERIA: Zungeru, 1 ♀, 23.ii.11 (*J. W. S. Macfie*). MADAGASCAR: Ouest, Ranohira, 860 m., 1 ♀, 26.i.–4.ii.58 (*B. Stuckenberg*). MOZAMBIQUE: Lower Zambesi River, Luabo, 1 ♀, viii.1957 (*P. J. Usher*). CONGO: Katanga, Teuhe, 30.vii–9.vii.1931 (*T. D. A. Cockerell*); Plaine herbeuse près de Mwashia, 1 km. de la Saline, 5 ♂, 3 ♀, 3.v.39 (*H. J. Bredo*), I.R.S.N.; Marais Kalula, 1 ♂, 1 ♀, 3.v.39 (*H. J. Bredo*), I.R.S.N.; Liberge vallée, Liki Bembe, Bavula, 1 ♀, 28.ii.48 (*S. Esobe, R. Cremer, M. Neuman*), I.R.S.N.; Bafwasende, 1 ♀, 18.xii.36 (*J. Ghesquière*), I.R.S.N.; Terr. Rutshuru, 3 ♀, vii.1937, Mission Prophylactique; Rutshuru, 1 ♂, 2 ♀, 17.v.36 (*L. Lippens*); Rutshuru, 1 ♀, ix–x.1936 (*Delville*); Rutshuru, Fuku, 1 ♂ 15.v.36 (*L. Lippens*); Kalembelembe, Baruka, 1 ♂, 4 ♀, vii.18 (*R. Mayne*); Nyangwe, 3 ♂, 10 ♀, iv–v. 1918 (*R. Mayne*); Uele-Aba, 1 ♀, 30.ii.14 (*Don* and *Laree*); Zambi, 1 ♀, ii–iii.1937 (*Dartevelle*); Uvira, 1 ♀, x.22; Lomami, Kambaye, 1 ♀, x.1930 (*P. Quane*); Ubargi Dula, 1 ♂, 17–19.i.32 (*H. J. Bredo*); Kissenyi, 1 ♂, 5.vi.55 (*F. François*).

Paralimna* (*Paralimna*) *nigripes bona Cresson **ssp. rev.**

Paralimna bona Cresson, 1933 : 29.
Paralimna bona Cresson, 1947 : 110.
Paralimna bona Cresson; Wirth, 1955 : 54.
Paralimna nigripes Adams; Soika, 1956*a* : 492.

Very closely related to *Paralimna nigripes* Adams, resembling it in almost all the diagnostic characters, apart from the absence of brown buccae and the reduction of the amount of brown on the mesonotum and mesopleuron. The colour of the buccae and pleura is usually a sound character in this genus, more trustworthy than many bristle characters. The genitalia are only different in slight but consistent ways. The reason for Soika's synonymy may be due to the fact that Cresson wrongly labelled a specimen of *Paralimna nigripes* as *Paralimna bona*, the correctly recorded specimen being placed with the type and the misnamed specimen.

Recorded from LIBERIA, KENYA and SOUTH AFRICA (Natal).

Paralimna* (*Paralimna*) *setifemur Cresson

(Text-figs. 45, 88)

Paralimna setifemur Cresson, 1939 : 10.
Paralimna setifemur Cresson; Soika, 1956*a* : 494.

A large species most closely related to *Paralimna nigripes* Adams, with a distinctive character in the spination of the fore femora, more markedly so in the male than the female. Face darker than *Paralimna nigripes* due to pale brown infusion and with two or more strong porrect facials. Both buccae and mesopleura have some dark brown dusting, but neither are predominantly dark.

♂. *Head:* antennal segment III twice as long as broad, greyish. Arista with fourteen to fifteen lateral hairs. Face in profile strongly curved in dorsal half, but carina not distinct. Face predominantly brown with a number of short bristles and hairs and a median dark brown line extending almost to ventral edge. Two very strong, and one weaker bristle, widely spaced, and inserted more ventrally than in *Paralimna arabica* Becker. Buccae grey with slight brown darkening, buccal bristle relatively weak and curved.

Thorax: mesonotum grey, with dark brown vittae and strong irroration. Pleura grey, some brown on meso- and sternopleuron.

Legs. Middle and hind tarsi pale, rest dark with strong grey dusting. Fore femora with a single row of closely set short bristles on anteroventral face, equivalent to normal male comb. Posteroventrally is a row of more closely and irregularly set longer bristles along the complete length. Fore tibiae clothed on ventral surface with short, dense setae.

Wings hyaline.

Abdomen: abdominal segment two with complete grey fascia, on all the others grey, interrupted by median brown vitta.

Male genitalia (Text-figs. 45, 88) large and strongly chitinized.

♀. Face less dark, only two strong facial bristles, and abdominal segment two with incomplete grey fascia. Fore femoral series of similar form to male but all bristles appreciably shorter.

Unfortunately the type appears lost, but there are three other specimens, all from Kenya, in B.M.(N.H.).

Material studied. KENYA: Lake Jipe, 1 ♂, viii.47 (*Van Someren*); Nyeri (S), 1 ♀, vi.49 (*Van Someren*); Nairobi, 1 ♂, vii.30 (*Van Someren*). MOZAMBIQUE: Lower Zambesi River, Luabo, 1 ♀ (*P. J. Usher*). CONGO: Plaine herbeuse près de Mwashia, 1 km., de la saline, 2 ♂, 1 ♀, 3.v.39 (*H. J. Bredo*), I.R.S.N.; Terr. Rutshuru, 1 ♂, 1 ♀, 30.vii.37, Mission Prophylactique.

Paralimna* (*Paralimna*) *puncticollis Becker

(Text-figs. 46, 82)

Paralimna puncticollis Becker, 1923 : 72 (♀).
Poecilothorax angustus (Becker) Cresson, 1929 : 187 (♂).
Paralimna puncticollis Becker; Cresson, 1947 : 109.
Paralimna puncticollis Becker; Wirth, 1956 : 384.
Paralimna puncticollis Becker; Soika, 1956*a* : 494.
Paralimna puncticollis Becker; Wirth, 1960 : 394.

Apart from the lighter ventral face, grey lateral band on mesonotum and pale tarsi, very similar to *Paralimna nigripes* Adams. Differs from *Paralimna poecila* Wirth, in facial colour and possession of fore femoral comb.

♀. *Head:* antennal segments I and II dark, III with short brown and long pale pubescence. Arista with fourteen lateral hairs. On carina and between antennal foveae dark brown, remainder of face silver-grey. At least three strong curved bristles, more in the South African form, plus two to three short setulae. Buccae dark brown with numerous setae and one short porrect bristle. Frons patterned in light and darker brown, setation normal.

Thorax: mesonotal ground colour light greyish buff, with a pair of median brown vittae and light irroration, laterally grey, scutellum same. Metapleuron grey, other pleurae dark brown.

Legs: all tarsi pale, legs dark blackish brown.

Wing membrane hyaline, veins yellowish brown.

Abdomen: ♀, grey fasciae broad, greater than half of the segment, divided medially on segments three to five by median brown vitta, brown fasciae very narrow and short on segment two. The male allotype of *P. angustus* Becker is this species, with the same data as the above ♀ type. Nine to ten short curved and flattened setae in middle half of anteroventral face of fore femora, fore tibia quite strongly curved. Male abdominal segment two, as in female, three similar to two, four and five generally darkened when viewed caudally, and with narrow and divided grey fasciae.

Male genitalia (Text-figs. 46, 82).

♂ length 2·0 mm. (♀ 4·0 mm.).

Type specimens of both species from Khartum [*sic*], Aegypt, Sudan (*Ebner*), 16.ix.1914. Zool. Garten. Vienna Museum.

In the collections I have studied, a rare species. The specimens recorded from Ngong, Cresson, 1947, are not typical, and I am doubtful of their conspecificity.

Material studied. SOUTH AFRICA: Transvaal, Skukuza, 3 ♂, 2 ♀, 23.xi.59 (*B. Stuckenberg*); Pretoria, 1 ♀, v.1948 (*J.C.F.*). MOZAMBIQUE: Luabo, 3 ♂, 3 ♀, i.1956 (*P. Usher*); Lower Zambesi River, Luabo, 2 ♂, 3 ♀, 1.v.58 (*P. Usher*). RHODESIA: Salisbury, Dept. Agric., 1 ♀, ii.1932 (N.Y.).

A series from the Congo have more yellowish faces and resemble *Paralimna poecila* Wirth, apart from possessing male fore femoral combs.

***Paralimna (Paralimna) poecila* Wirth**

(Text-fig. 81)

Paralimna poecila Wirth, 1964 : 3.

A small species, of which I have seen only a male paratype. Very similar to *Paralimna nidor* Cresson, in having very reduced male fore femoral comb, but mesonotal colouring resembles that of *Paralimna punticollis* Becker, to which it also bears some resemblance in abdominal pattern.

There is little to add to Wirth's full description but comment may be made of the fact that *Paralimna nidor* Cresson, is included in the comparison on p. 385 as having a male fore femoral comb, which it has not, thereby separating this species more strongly than is the case. This species may be identified on the following characters:

Small size, yellow face with rather weak facials, buccae dark brown with a single porrect bristle. Mesonotum vittate and irrorate with dark brown on buff-brown, laterally grey. Pleura dark brown excepting metapleuron. Legs dark, palpi pale. A long series of very short hairlike setae on anteroventral face of fore femora of male. Wings with a hyaline membrane, hind cross vein slightly darkened. Abdominal segment two has a complete grey fascia, it is interrupted on other segments. Last two segments distinctly darkened, in male.

S. Rhodesia is the only area from which this species has so far been recorded.

The male genitalia (Text-fig. 81) are very similar to *Paralimna puncticollis* Becker, and the two species are obviously very closely related. However, the absence of a male femoral comb is a character which, on present evidence, is sufficient to separate the species.

Paralimna (*Paralimna*) *cruciata* sp. n.

(Text-figs. 50, 84)

A large species, closely related to *Paralimna nigripes* Adams, but differing from it in facial and pleural colouration, and cruciate ocellar bristles of male.

♂. *Head:* antennal segments I and II dark with golden brown dusting, segment III off-white due to dense covering of short pile and fewer long hairs. Arista with twelve lateral hairs. Face silver-grey, apart from golden brown lateral regions and central carina on which the brown colouration extends two thirds of facial length. Buccae are silver-grey with heavy golden brown dusting. Facial series consists of one strong dorsal bristle and eight or more weaker bristles. One long buccal bristle and a shorter weaker bristle ventral to it plus numerous short buccal bristles. No outstanding posterior buccal bristle. Frons with median stripe from ocellar triangle, divided longitudinally, joining a broad band along the anterior edge of the frons. The whole frons changes in colour depending on angle of light. One half of the frons and the opposite half of the dividing bands alternate, with the reverse pair, from golden brown to blackish brown. Ocellar bristles short and cruciate above the anterior ocellus.

Thorax: mesonotum dark brown mottled with golden brown, an indistinct median dark brown vitta, sides of mesonotum, lateral to supra-alars and presuturals, grey. Sides of scutellum grey. Pleurae light brown with the lateral grey of mesonotum extending as a narrow band on to mesopleuron. Ventrally, pleura grey-brown.

Legs apart from tarsi dark, fore and hind tarsi dark, but with dense golden yellow ventral hairs. Fore femora with fifteen to sixteen long flat curved hairs on the anteroventral face.

Wing membrane hyaline, halteres pale lemon-yellow.

Abdomen: with a median broad vitta on segments three to five and lateral brown fasciae on the anterior half of all segments. Genitalia as Text-figs. 50, 84.

♀. Differs from ♂ in having larger, but reclinate, ocellar bristles. Grey lateral regions of mesonotum reduced in area, or absent. Frontal pattern variable but always with a ' changing ' pattern.

Holotype ♂. MADAGASCAR: Soubirano, Lokobe, Nossi-Bé, 6 m., 1 ♂, 9–23.xi.57 (*B. Stuckenberg*).

Paratypes. MADAGASCAR: Soubirano, Lokobe, Nossi-Bé, 9 ♂, 9 ♀, 9–23.xi.57 (*B. Stuckenberg*); Ouest, Ranohira, 860 m., 2 ♂, 1 ♀, 26.i.–4.ii.58 (*B. Stuckenberg*); Fia, Ranohira, 1 ♀, 7.iii.58 (*F. Keiser*).

Type to N.M., one paratype to Basle; 4 ♂ and 3 ♀ paratypes to B.M.(N.H.) and remaining paratypes to N.M.

Paralimna (*Paralimna*) *mariae* sp. n.

(Text-fig. 89)

Very similar in colouring and pattern to *Paralimna cruciata* sp. n. but differs in lacking the cruciate ocellars and has both fronto-orbitals strongly developed.

♂. *Head:* antennal segments I and II dark with golden brown dusting, segment III pale due to extensive dense pale pubescence. Arista with ten lateral hairs. Face grey between facial series, brown laterally extending from around base of facials and parafacials to mouth edge. Central carina broad and irregularly darkened with brown. Area of buccal bristles dark brown, small bare area ventral to eye and extending on to buccae, grey. Facial series consisting of one very strong, long curved bristle widely separated from the rest of the series, which consist of two strong and numerous weak bristles. Epistoma prominent and brown. Two to three short but strong porrect buccal bristles. Frons generally dark with slight patterning, the latter consisting of small light grey and brown patches, only area anterior to frontal bristles with numerous short setulae. Centre of frons with a large round indistinct velvet black spot, just anterior to ocellar triangle. Fronto-orbital bristles well developed, anterior only a little longer than posterior but appreciably stronger.

Thorax: mesonotum grey with strong irrorations and two broad irregular vittae running along the lines of the dorsocentrals, numerous short irregularly arranged vittae coalesce with the median vittae over the posterior half. Mesonotum laterally grey. Scutellum grey on the sides and edges of the disc, latter dark brown. Pleura grey with irregular dark brown patches on the meso-, ptero- and sternopleura.

All legs predominantly dark with some paleness on the tarsi, together with the golden ventral fringes on the hind tarsi. Fore femur with nineteen to twenty curved flattened setae on the antero-ventral surface.

Wing membrane hyaline with dark black-brown veins, some brown dusting on extreme base. Basal costal section with strong bristles.

Abdomen: grey lateral fasciae on all segments, delimiting the median brown vitta, latter very narrow on segment two, grey fasciae broadly expanded lateroventrally on segments.

♀ More brown on pleura, less grey laterally on mesonotum, face with more brown. Posterior fronto-orbital bristle shorter in proportion to anterior bristle. Grey fasciae on abdomen broader and median brown vitta strongly constricted on all segments, disjointed on segment two.

There are minor differences in male genitalia between this species and *Paralimna cruciata* sp. n., the latter the Malagasy form of *Paralimna maria* (Text-fig. 89).

Material studied. Holotype ♂ (one wing missing). South Africa: Witsands Dunes, Cape Peninsula, 25–16.ix.1959 (*B. & P. Stuckenberg*), to N.M.

Paratypes. 1 ♀, data as type, to B.M.(N.H.); South Africa: Cape Province, Paarl, 1 ♀, 24.x.54, S.A.Inst.Med.Res.; Cape Province, Cape Peninsula, Hout Bay, Skoorsteenkop, 26.xii.50 (*Brinck-Rudebeck*), in insect trap, No. 93, Swedish S. Africa Exp. 1950–1951. To N.R.S.

***Paralimna* (*Paralimna*) *dorina* sp. n.**

(Text-fig. 85)

In form resembling a large *Paralimna nidor* and referred to by Cresson (1947 : 110) as that species, but differing in possessing a comb of widely separated and narrowly flattened bristles on the fore femora of the male. The male genitalia bear a considerable resemblance to those of *Paralimna nigripes* (Text-fig. 85).

♂. *Head:* antennal segments I and II dark blackish brown, segment III paler, due to whitish pubescence. Arista with eleven to twelve lateral hairs. Face dark brown, pollinose with varying amounts of golden brown pollen. Three strong facials plus numerous shorter and weaker facial bristles and hairs. Central keel on dorsal half of face only, ventral portion flattened (cf. *sponsa* and *nidor*). Buccal bristle long, three to four porrect weak bristles and numerous short decumbent setae. Frons dark brown patterned with golden brown, all frontal bristles present, posterior fronto-orbital short and weak.

Thorax: mesonotum pale golden brown with three dark reddish brown vittae, one median, and a pair along the line of the dorsocentrals. Supra-alar depression pale greyish brown. Pleura dark reddish brown, metapleura greyish brown.

Legs: tarsi pale, remainder of legs blackish brown. Fore femora with eleven to twelve flattened curved bristles widely separated at their bases.

Wings with membrane hyaline and veins dark brown, infumated along their lengths.

Abdomen: fasciae over posterior half of each segment, and median brown vitta interrupted only on segment two.

♀. Very similar to ♂ but mesonotum laterally more grey dusted.

Holotype ♂. KENYA: Ngong, v.45 (*Van Someren*), to B.M.(N.H.).

Paratypes. 1 ♂, 6 ♀, same data, to B.M.(N.H.).

***Paralimna* (*Paralimna*) *dorina rhodesiensis* ssp. n.**

Similar in general form to the nominal subspecies but differing in the following way:

♂. Face generally paler, sufficiently so to enable the median brown line to be visible, facial protuberance large, tending to displace the antennae dorsally, and it is possible that some difficulty may be experienced in placing this species in the correct group on antennal position, in relation to the dorsal edge of eye. Facial series of two long, rather weak bristles, one of half the length, and numerous shorter very weak bristles. Two longer subequal and numerous very short decumbent buccal bristles. Frontal region pale with characteristic labyrinthine pattern, the anterior frontal bristle just posterior to anterior orbital in the type but not in the other male.

Fore femoral armature of male similar in form but flattened bristles slightly shorter. Tarsi on all legs pale. Wing membrane totally hyaline and veins pale reddish yellow.

♀. Similar to ♂ in most respects, generally slightly darker in facial colour.

Described here as a separate subspecies due to the rather obvious differences in facial and wing colouring, facial form and very small genitalic differences.

Holotype ♂. RHODESIA: Salisbury (Nlei or Uhi), 20.i.10 (Collector ?) (N.Y.).

Paratypes. RHODESIA: Salisbury, (Nlei or Uhi), 1 ♂, 20.i.10 to B.M.(N.H.); Salisbury, (Nlei or Uhi), 2 ♀, 20.i.10, B.M.(N.H.) and N.Y.; Salisbury, 1 ♀, xii.1934 (*A. Cuthbertson*), B.M.(N.H.).

***Paralimna* (*Paralimna*) *insolida* sp. n.**

Body form as in *Paralimna puncticollis* Becker, but appreciably darker, only partially white dusted on face. In colouring very similar to *Paralimna sponsa* Soika, but differs in facial form and fore femoral armature of male.

♂. *Head:* antennal segments I and II grey blackish brown, segment III grey due to dusting. Arista with ten lateral hairs. Brown of face extending as grey vitta halfway down face. Latter very sparsely white dusted, having a teneral appearance. Facial series of one very long bristle and a number of shorter weaker hairs. Lateral areas of face, laterally on epistoma, and buccae brown. Latter with one strong bristle and a few short decumbent bristles. Frons and vertex brown, anterior fronto-orbital and frontal inserted laterally to each other. Outer vertical reclinate and posteriorly directed rather than outcurved.

Thorax: almost totally pale brown, slightly more grey laterally on the mesonotum and metanotum and with two or four narrow pale interrupted vittae on the central region of mesonotum between the dorsocentrals.

Legs totally pale brown, fore femora with eight to nine flattened curved setae and four to five slightly curved and flattened setae over basal half.

Wing with membrane totally hyaline.

Abdomen: with the grey posterior portion of fasciated pattern broadly interrupted on all segments.

Holotype ♂. CONGO: Elizabethville, 31.vii.1932 (*De Loose*).

Paratype. CONGO: Udangi Dula, 1 ♂, 17–19.i.1932 (*H. J. Bredo*).

Type material to M.R.A.C.

***Paralimna* (*Paralimna*) *uelensis* sp. n.**

Most closely related to *Paralimna nigripes* Adams but possessing the following distinguishing characters:

Head: antennae blackish with some pale pubescence on segment III. Arista with ten lateral hairs. Interantennal carina pale brown, rest of face grey. One strong curved facial, one or two shorter bristles and five to six short, weak hairs in facial series, slight brown dusting around base of facial bristles. Buccae grey, weakly haired with few hairs on the disc. Frons brown, frontal inserted posterior to anterior fronto-orbital.

Thorax: pleura grey. Mesopleuron with central brown area, mesonotum predominantly grey but with three narrow brown vittae between the dorsocentrals and scattered lateral patches of brown dusting.

Legs blackish brown with grey dusting, tarsi and trochanters pale. Fore femoral armature of male consists of thirteen to fourteen flattened curved bristles and four to five slightly flattened and curved bristles over the basal half.

Wings with membrane hyaline.

Abdomen: with usual fasciated pattern, posterior grey half of segments only complete on second segment, interrupted medially on remaining segments by brown vitta.

♀. More brown dusting on mesonotum and on mesopleuron.

Holotype ♂. CONGO: Uele, Gangala na Bodio, 15.iv.36 (*L. Lippens*) to M.R.A.C.

Paratypes. CONGO: Uele, Gangala na Bodio, 1 ♀, 14.v.36 (*L. Lippens*) to M.R.A.C.; Uele, Gangala na Bodio, 1 ♀, 15.v.36 (*L. Lippens*) to B.M.(N.H.); Haut Uele, Paulis, 1 ♀, v.47 (*P. L. G. Benoit*) to M.R.A.C.

***Paralimna* (*Paralimna*) *adversa* Cresson sp. rev.**

(Text-fig. 86)

Paralimna adversa Cresson, 1933 : 28.
Paralimna adversa Cresson; Cresson, 1947 : 110.
Paralimna nigripes Adams; Soika, 1956*a* : 492.

A small species from West Africa very closely related to *Paralimna nigripes* Adams, but in my opinion specifically distinct. In common with *Paralimna nigripes bona* Cresson, the buccae and pleura are only lightly marked with brown. Most easily distinguished from all three subspecies of *Paralimna nigripes* dy the position of the frontal bristle in relation to the fronto-orbitals, the latter being well anterior to the anterior fronto-orbital bristle. Male genitalia as in Text-fig. 86.

I have seen no specimens other than the type series.

Paralimna (Paralimna) invisa Soika

(Text-fig. 83)

Paralimna invisa Soika, 1956*b* : 124.

A difficult species to differentiate, without outstanding characters, with the possible exception of the male fore femoral armature of ten to twelve short flattened setae. The face is darker than *Paralimna puncticollis* Becker, but in other respects closely resembles this species.

♂. *Head:* antennae segments I and II dark, segment III paler and arista with eleven lateral hairs. Face golden brown with a darker brown crescent between the buccal angles. Facial series of numerous weak and at least one strong bristle. Buccae dark brown with a small grey area ventral to the orbit. Frons with basic ground colour of golden brown, two darker bands broad at frontal suture, narrowing strongly and fusing posteriorly to ocellar prominence. Occiput grey. Fronto-orbital just anterior to frontal bristle.

Thorax: mesonotal ground colour light golden brown, becoming grey laterally. Three median vittae of dark brown between dorsocentrals, the central vitta two thirds width of lateral. Grey pollen on humeral region and extending posteriorly onto notopleuron. Scutellum brown on disc and apically, grey laterally except at apex. Mesopleuron dorsally brown remainder and sternopleuron greyish brown.

Legs: femora and tibiae dark, tarsi pale. Fore femora with ten to twelve short, less than width of femur, flattened setae, tips of the more apical flattened and curved.

Wing membrane hyaline, veins pale brown. Halteres pale yellow.

Abdomen: apart from segment one which is predominantly grey, the grey fasciae are reduced and restricted to lateral and posterior thirds of segments. External claspers as Text-fig. 83.

♀ similar to male, slightly lighter in colour with more obvious mesonotal patterning.

Apart from the type from the Congo I have only seen the following.

SIERRA LEONE: Batkanu, 1 ♂, 2 ♀, 28.viii.1911 (*H. E. Arbuckle*).

The *NIDOR*-species group

Small species with dark, narrow, and normally strongly receding ventral facial region. Eyes large in comparison with head size. Male fore femoral armature reduced or absent.

Paralimna (Paralimna) nidor Cresson

(Text-fig. 62)

Paralimna nidor Cresson, 1933 : 31.
Paralimna nidor Cresson; Cresson, 1947 : 110.
Paralimna nidor Cresson; Wirth, 1955 : 54.
Paralimna nidor Cresson; Soika, 1956*a* : 493.

An interesting species very closely related to *Paralimna sponsa* Soika, and, from the region of the Congo, very difficult to differentiate in the female sex. Differs from *Paralimna sponsa* in facial colour, and lack of fore femoral armature of the male. In his description, Cresson expressed some doubt as to the validity of this species, but in later work refers to it as a distinct species. The series from Ngong in Kenya recorded by Cresson (1947 : 110) is in fact a distinct species, being larger and darker with a comb of setae on the male fore femora. This species is described in this work as *Paralimna dorina* sp. n.

♂. *Head:* predominantly dark brown but due to the extensive grey dusting of the ventral region of the face in Congolese specimens, this species is keyed twice in separate parts of the key to species. Face slightly paler, with a median, and often two lateral, darker lines. Facial series of two to three long weak bristles, widely separated at their insertion, and numerous short hairs. Anterior fronto-orbital lateral to, or only slightly anterior to the frontal bristle (cf. *sponsa*). Buccae dark brown with strong bristles in irregular rows.

Thorax: dark brown, with three interrupted yellowish brown vittae on the mesothorax between the dorsocentrals and varying amounts of grey dusting laterally. Pleura dark brown.

Legs totally brown, fore and hind tarsi may have a short golden yellow ventral brush.

Wings: membrane uniformly infumated.

Abdomen: with narrow grey fasciae, almost complete on segment two, but on other segments interrupted by a broad continuous brown median vitta.

♀ very similar to ♂ in body form and colouring.

♂ *genitalia* almost identical with those of *Paralimna sponsa* (Text-fig. 62).

Material studied. CONGO: Rutshuru, 36 ♂, 15.v.36 (*L. Lippens*); Urundi Bururl, 1 ♂, 1949 (*F. François*); Ruanda, Cite de Nkuli, 5 ♂, 17.iii.36 (*L. Lippens*); Rutshuru, 9 ♂, 7.v.37 Mission Prophylactique; Kamogobe (Sud Masisi), 15 ♂, 4.iii.36 (*L. Lippens*); Uéle, Gangala na Bodio, 5 ♂, 15.iv.36 (*L. Lippens*); E. Rutshuru, Kibirizi (frontière), 1 ♂, 6.ii.36 (*L. Lippens*); Elizabethville, 1 ♂, ii.1950 (*C. Seydel*) à la lumière; Rives Busira, 1 ♂, vi.36 (*J. Ghesquière*) (I.R.S.N.); Rutshuru, 1 ♂, 8.i.37 (*J. Ghesquière*) sur pierres (I.R.S.N.). UGANDA: Ruwenzori Range, Namwamba Valley, 10,000 ft., 1 ♀, xii.1934–i.1935 (*T. E. Jackson*); Ruwenzori Range, Kilembe, 4,500 ft. 3 ♂, 14 ♀, xii.1934–i.1935 (*F. W. Edwards*); Kyarumba, 4,500 ft. 3 ♀, xii.1934–i.1935 (*D. R. Buxton*); Budongo Forest, 1 ♀, 7.ii.1935 (*F. W. Edwards*).

Paralimna (Paralimna) sponsa Soika

(Text-fig. 61)

Paralimna sponsa Soika, 1956*a* : 492.

A common species from Central Africa, very difficult to distinguish from *Paralimna nidor* Cresson in the female sex. The characteristic male fore femoral armature of a small number, eight to ten, flattened bristles, inserted over the apical third will separate this species from all others. In the typical form, the face is pale grey and the ventral region strongly receding.

♂ similar in colour to *Paralimna nidor*, differs as follows.

Head: face silver-grey, with one strong upper facial and one to two strong lower facial bristles. Dorsal facial region and buccae brown, latter with numerous short bristles. Buccae narrow. Frons with a labyrinthine pattern in brown and dusted yellow-brown. Anterior fronto-orbital bristle in advance of frontal.

Thorax: three narrow brown vittae on middle third of mesonotum, a broader more irregular brown band between the median vittae and lateral edge of mesonotum. Humeral region dusted grey. Majority of pleura dark brown.

Legs totally dark, tarsi slightly paler. Fore femora of male with eight to ten flattened bristles inserted over apical third. Scutellum brown with silver edges.

Wings: veins dark and membrane uniformly infumated, hind cross vein darkened along its length. Halteres reddish yellow.

Abdomen: dark brown, with grey fasciae, almost complete on segment two only.

Genitalia (Text-fig. 61) very similar in form to *Paralimna nidor*.

♀ differs only in colour of face, but area of brown variable.

Material studied. ANGOLA: Dundo, 1 ♂, ii.1960 (*B. Machado*). UGANDA: N. Mt. Elgon, 6,250–6,500 ft., 1 ♀, 18.x.64 (*R. W. Crosskey*); Mafuga forests, Kigezi, 1 ♀, vi.57 (*Van Someren*); Kigezi, Mafuga Forest, 7.vi.1957 (*V. G. L. Van Someren*).

CONGO: 39 km. S. of Malikale, 700 m., 14 ♂, 14 ♀, 25.xii.57 (*E. S. Rosst*). N.Y.; Elizabethville, Conpono, 1 ♂, ix.1931 (*Alice Mackie*) (N.Y.); Costermansville, 6 ♂, v.38 (*J. Ghesquière*) (I.R.S.N.); Rives Busira, 1 ♂, vi.1936 (*J. Ghesquière*) (I.R.S.N.); Rutshuru, 1 ♂, i.37 (*J. Ghesquière*) (I.R.S.N.); cav. Rutshuru, plaine de lave anciennement boisee, 1 ♂, xi.1937 (*J. Ghesquière*) (I.R.S.N.); Sake-Kivu, 1 ♂, 27.i.37 (*J. Ghesquière*) (I.R.S.N.); Terr. Masisi, Kishengo, 1 ♂, 25.viii.37 (*J. Ghesquière*) (I.R.S.N.); Rutshuru, 48 ♂, v.35–iv.36 (*L. Lippens*); Ruanda, Gite de Nkuli, 8 ♂, 17.iii.36 (*L. Lippens*); Terr. Rutshuru, 11 ♂, vii.37 (Mission Prophylactique); N. Lac Kivu, Rwankwi, 1 ♂, v.48 (*J. V. Leroy*); Ruanda, Kisenyi, 1 ♂, 21.v.57 (*F. François*); Kamogobes (Sud Masisi) 10 ♂, 4.iii.36 (*L. Lippens*); Ruanda, Gite de Nkuli, 5 ♂, 18.iii.36 (*L. Lippens*); Ruanda, Urundi, Bururi, 2 ♂, x.48 (*F. François*); Uele, Bayenga, terr. Wamba, 810 m., 1 ♂, 25.xi.56 (*R. Castelain*).

The Angolan specimen is appreciably lighter in mesonotal colour and patterning.

Paralimna* (*Paralimna*) *ustulata Wirth

(Text-fig. 60)

Paralimna ustulata Wirth, 1956 : 385.

A small species, related to *Paralimna nidor* Cresson but appreciably darker in colour, and the males possessing a fore femoral comb of setae. The wing veins of most specimens are very strongly infumated. To Wirth's description may be added the following brief diagnosis:

Antennae black-brown. Arista with nine to ten lateral hairs. Head and thorax almost totally chocolate-brown, anterior edge of frons in some male specimens and mesonotum and scutellum laterally grey.

Legs dark brown, fore femora of male with seven, well spaced flattened setae on antero-ventral face.

Wings with hyaline membrane and dark veins, the membrane infumated widely along their lengths.

Abdomen: normal fasciated pattern, with complete grey fascia on segment two only, last two segments strongly darkened in male. Female with generally less of brown fascia but complete median vitta.

Male genitalia (Text-fig. 60).

Apart from the type material, the only other typical specimens I have seen of this species are as follows:

Material studied. S. AFRICA: Natal, Nr. Milani in Ahrens District, 1 ♂, 2 ♀, iv.62 (*B. & P. Stuckenberg*).

The following specimens resemble the typical form in wing pattern and male genitalia but differ in density of body colour.

S. Africa: Natal, Drakensberg, Van Reenan, 3 ♀, xi.1926 (*R. E. Turner*); Natal, Karkloof Range, nr. Mt. Alida, Geekies Farm, 1,500 ft., 1 ♂, 1 ♀, 4.i.62 (*B. & P. Stuckenberg*); Natal, Gilitts, Pinetown District, 1 ♀, 11.i.62 (*B. & P. Stuckenberg*).

The *ARABICA*-species group

Predominantly large species, with long vertical faces and horizontal vertex and frons. The antennae are usually inserted in line with the dorsal region of the eye.

Paralimna (Paralimna) arabica arabica Becker

(Text-fig. 78)

Paralimna arabica Becker, 1910 : 154.
Paralimna arabica Becker; Cresson 1929 : 186.
Paralimna arabica Becker; Soika, 1956*a*: 490.

I agree with Soika (1956*a* :490) in considering *Paralimna nubifer* Cresson, as only a southern subspecies of *Paralimna arabica* Becker.

A cinereous species with high face, characterized as follows:

Head: antennal segments I and II dark with dense grey dusting, III pale, also with grey dusting and pale pubescence. Arista pale brown with eleven to twelve lateral hairs. Face with distinct carinal protuberance. Ventral face greyish white, dorsal face grey with some dark dusting. Facial series of one strong bristle inserted high on face. Two to three stronger but short bristles more ventrally inserted on series, not porrect, plus numerous short decumbent setulae. Buccae totally grey, buccal bristle strong, numerous short bristles. Parafacialia silvered. Frons and vertex patterned with light brown on grey, central grey area around ocelli and ocellar bristles. Brown anterior frons setulose. Posterior fronto-orbital weak and short.

Thorax: mesonotum greyish buff-brown with darker brown indistinct vittae and irrorations. Disc of scutellum similarly marked, laterally silver grey. Pleura totally pale grey, very faint brown area in some specimens, in centre of the mesopleural sclerite.

Legs: all tarsi pale, rest of legs with heavy dark grey dusting. Male fore femoral armature consisting of eight to ten flattened bristles, widely separated and inserted over the majority of the anteroventral face. Strong yellow flexor pile on hind tarsi.

Wings, membrane hyaline or with slight infumation, small diffuse darker brown area at apex of second vein extending vertically over marginal and submarginal cells. Halteres pale yellow.

Abdomen: with normal but less discrete fasciated grey and dark brown pattern. In some specimens brown reduced in area.

Male genitalia (Text-fig. 78).

Size range considerable, 4–6·5 mm. body length.

Material studied. W. Aden Prot.: Wadi Dareiza, S.W. of Dhala, *c.* 4,500 ft., 10 ♂, 28 ♀, 6–9.xi.1937. Jebel Jihaf, Wadi Leje, *c.* 6,800 ft., 1 ♀, 13–15.x.37. Wadi Tiban, N.W. of Jebel Jihaf, *c.* 3,800 ft., 2 ♀, 21.x.37. Yemen: Wadi Jaira, trib. of Wadi Sihan, *c.* 3,000 ft., 6 ♂, 8 ♀, 10.iii.38 (*H. Scott & E. B. Britton*); Usaifira, 1 mile N. of Ta'izz, *c.* 4,500 ft., 1 ♀, 13.xii.37 (*H. Scott & E. B. Britton*).

Paralimna (Paralimna) arabica nubifer Cresson

May be distinguished from the nominate subspecies by the following characters:

Generally larger size, darker colouring, dorsal face and frons darker brown, brown on the mesopleurae and mesonotum and area of brown abdominal fasciae greater. Wings with or without the diffuse infumated areas, but infumation not restricted to veins and their apices. In the very large series in the B.M.(N.H.) males are relatively scarce.

Material studied. Numerous examples including the following:

SIERRA LEONE: Magberta, 6 ex., 8.ix.24; Senahu, 3 ex., 13.x.12 (*J. S. Simpson*); 6 ex., Roboro, 18.ix.24 (*E. Hargreaves*). NIGERIA: Ibadan, 7 ex., 21.viii.13 (*W. A. Lamborn*); Zungeru, 5 ex., 15.xi.1910 (*J. S. Macfie*); Lagos, 1 ex., i.1959 (*C. H. Andrewes*); Shika Ponds, Zaria, 3 ex., 29.vi.66 (*J. M. Lyall*); Bude Dobe, 1 ex., 28.v.12 (*J. W. S. Macfie*); Ilorin, 4 ex., iv.1912 (*J. W. S. Macfie*); Oshogbo, 3 ex., (*T. F. G. Mayer*); Offa, 2 ex., 25.iii.12 (*J. W. S. Macfie*); Kateri, 1 ex., 2.xiii.10 (*J. J. Simpson*). GHANA: Tomali, 75 ex., xi.1916 (*J. J. Simpson*); Accra, 31 ex., 1922 (*J. J. Simpson*); Nr. Accra, Taiman, 33 ex., ix.1922 (*J. W. S. Macfie*); Aburi, 2 ex., 1912–13 (*W. H. Patterson*); Obuasi, 2 ex., 17.vii.06 (*W. M. Graham*); Kororidua, 1 ex., 5.viii.19 (*F. H. Storey*); Insuta, 3 ex., 9.ix.28. LIBERIA: Gbanga, 1 ex., ix.26 (det. as *P. dasycera* Bezzi) N.Y. CONGO: Katanga, Lufira River, 3,500 ft., 19.ix.07 (*Neave*); Parc Nat. Albert, 7 ex., 20.ix.37 (*J. Ghesquière*); Marais Kalulu, 1 ex., 3.v.39 (*H. J. Bredo*) (I.R.S.H.); Mwashia, 1 km. de la salire, 2 ex., 3.v.1939 (*H. J. Bredo*) (I.R.S.H.); Terr. Rutshuru, 30.viii.37, 6 ex., Mission Prophylactique; Nyangwe, 14 ex., iv–v.1918 (*R. Mayne*); Kasongo, 1 ex., viii.59 *P. L. G. Benoit*); Rutshuru, 4 ex., 17.v.36 (*L. Lippens*); E. Rutshuru, Kibirizi, Frontière), 2 ex., 6.ii.36 (*L. Lippens*); Yangambe, (Stan.) 1 ex., xi.57 (*P. Dessart*); Elizabethville, 1 ex., ii.50 (*C. L. Seydd*); Uele, Gangala na Bodio, 2 ex., 15.v.36 (*L. Lippens*); Kwango, Kinlati-Yasa, 1 ex., 15.ii.52 (*R. P. J. Ruelle*); N. Kawirondo, Yala Bridge, 1 ex., 24.viii.1911 (*W. Woodhouse*). KENYA: Nairobi, 2 ex., vii.30 (*Van Someren*); Tavete For., 1 ex., viii.47 (*Van Someren*); Teita Hills, 1 ex., viii.47 (*Van Someren*); Mombasa, 1 ex., xi.27 (*Symes* and *Hopkins*). MALAWI: Mainvale, 2 ex., 6.iv.1932 (*W. A. Lamborn*); Blantyre, 7 ex., 1910 (*J. E. S. Old*). UGANDA: E. Busia, 4 ex., 1913 (*F. Spire*); L. George, 1 ex., 1931 (*E. B. Worthington*); Buamba Forest, Semliki Valley, 2 ex., 2,300–2,800 ft. (*D. Bruce*); Ruwenzori Range, Fort Portal, 2 ex., 4.xii.1934 (*F. W. Edwards*). ZAMBIA: Chilanga, 1 ex., 2.ix.13 (*R. C. Wood*). TANZANIA: Ufiomi, 1 ex., 3.vi.1916 (*W. A. Lamborn*); Zanzibar, 1 ex., i–ii.1925 (*H. J. Snell*); Songea, 3,800 ft., 1 ex., 23.iii.33 (*R. F. Johnstone*); Mpwapwa, 12 ex., vii.45 (*P. A. Buxton*).

***Paralimna (Paralimna) arabica ugandensis* ssp. n.**

(Text-fig. 79)

A subspecies of distinctive rank, being easily distinguishable from *arabica* and *nubifer* by the pale golden brown facial colour and the strongly marked wings.

Differs from the described subspecies of *Paralimna arabica* in the following manner:

Arista with fourteen to fifteen lateral hairs, lower face pale golden brown rather than grey. Anterior part of bucca, majority of mesopleuron and mesonotum dark golden or matt brown.

Fore femora of male with ten flattened bristles in the anteroventral series but inserted over a shorter length than in either of the other subspecies. Wing membrane hyaline, dark brown veins, apices of first, second, third and fourth veins infumated along their lengths, broadly so around second veins, darkening the apex of the marginal cell.

♂ genitalia differs from *Paralimna a. arabica* and *Paralimna a. nubifer* in the form of the external claspers (Text-fig. 79).

Material studied. Holotype ♂. UGANDA: Ruwenzori Range, Kyarumba, 4,500 ft., xii.1934–i.1935 (*D. R. Buxton*). B.M. (N.H.).

Paratypes. UGANDA: Kisubi, 1 ♂, 1 ♀, 26.vii.38 (*B. Philip*), nr. Fountain in forest; Kampala, 1 ♂, 7.ix.18; Ruwenzori Range, Kilembe, 4,500 ft., 1 ♂, 4 ♀, (*F. W. Edwards*); as type, 2 ♂, 2 ♀; Katosi, 2 ♂, 3 ♀, 20.ix.36 (*E. G. Gibbins*), on debris at edge of lake; Segibwa Falls, 1 ♂, 3 ♀, 28.iii.1935 (*E. G. Gibbins*), attracted to human faeces; Ruwenzori Range, Fort Portal, 1 ♀, 4.xii.1934 (*F. W. Edwards* xii.1934–i.1935; 1 ♀, (*D. Bruce*) 1903; Ruwenzori Range, Mpanga valley, 6,000 ft., 1 ♀, xii.1934–i.1935 (*F. W. Edwards*). CONGO: Mambassa, 1 ♂, 8.ii.52 (*J. Wolfs*).

One specimen also from the Congo, I have not included as a paratype as it possesses a grey face.

Kasongo, 1 ♀, viii.59 (*P. L. G. Benoit*).

Paralimna (Paralimna) monstruosa Soika

(Text-fig. 76)

Paralimna monstruosa Soika, 1956*a* : 491.

Related most closely to *Paralimna lynx* Cresson, but unlikely to be confused, having a very high and prominent face, usually creamy or slightly silvery white, and very weak facial bristles, not the long porrect bristles of *Paralimna lynx* Cresson.

Head: with very long straight face, pure silver-white with yellow infuscation at the inter-antennal hump. One single very weak bristle in facial series plus a long line of tiny erect hairs, bristle occurring mid-orbitally. Epistoma very receding, silver-grey, palpi silver-white with a series of short bristles. Para-orbital region silver-grey laterally. Buccae dark brown with strong overall setulation and two very long and strong curved bristles, the dorsal of which extends beyond the face when viewed in profile. Antennae very distinctive, segment III with a broad white area basally, tip orange-brown. Arista with eleven lateral hairs. Frons with labyrinthine pattern arranged around ocellar prominance.

Thorax: diffuse pattern on lateral regions, two broad, poorly defined bands in centre. Scutellum brown and golden brown, dusted with silver-grey areas between the lateral scutellar bristles. Humeral areas of thorax grey, as also mesonotal and pleural suture. Metanotal areas completely grey. Mesopleural, sternopleural and anterior part of pteropleural sclerites dark brown.

Trochanters, tibiae, especially the fore, and tarsi all pale. Fore femora pale apically and basally. Posteroventral setae on fore femora not modified.

Wings infumated, hind cross vein darkened. Halteres pure white at tip, yellow at base.

Abdomen: abdominal setae on tergites short and weak with a few long and stronger setae laterally, and along the posterior regions of the tergites. Segment one with two grey dusty patches. Segment two with a narrow brown stripe, the grey band complete medially. Segment three brown and grey bands of same width, grey band interrupted by wedge of brown. Segment four, grey band slightly wider than brown, with broader brown wedge.

Male genitalia (Text-fig. 76).

♀. Differs most noticeably in colour of face, which is more grey and more vertical without the flattening and lateral ventral expansion.

Material studied. ANGOLA: Museu do Dundo, 3 ♂, 2 ♀, N.M. TANZANIA: Nyika, Kilossa, 1 ♂, 1935, (*G. Werner*), I.R.S.N; Luanda, Dundo, 1 ♂, 4 ♀, 21.ix.49 (*B. Malkin*).

Paralimna (Paralimna) lynx Cresson

(Text-fig. 80)

Paralimna lynx Cresson, 1933 : 30.
Paralimna lynx Cresson; Cresson, 1947 : 111.
Paralimna lynx Cresson; Soika, 1956*a* : 492.

This species has a high face similar to *Paralimna monstruosa* Soika, but differs most noticeably in having a darker face, longer facial bristles and a single long buccal bristle.

♂ and ♀. *Head:* antennal segments I and II dark, III covered in a pale pile of long hairs. Arista with thirteen lateral hairs. Face with grey lower dusting, changing to brown on carinal protuberance. Two or three long, weak, curved facials, touching in mid-line, and extending beyond anterior line of face when viewed laterally. Buccae brown, strongly bristled, the strong anterior bristle almost reaching facial margin. The anterior fronto-orbital bristle strong.

Thorax: metapleuron and metanotum grey, remainder of thorax dark brown with small scattered patches of grey on the mesonotum. Scutellum with dark brown areas around basal setae, and apical quarter of scutellum, dorsally and laterally, elsewhere grey dusted.

Legs: femora and tibiae dark, tarsi pale with some grey dusting and yellow hairs. Male fore femora armature not developed.

Wing membrane totally infumated, veins pale brown.

Abdomen: grey fasciae narrow, less than half of each segment, and totally delimited in female and delimited on all but segment three in male.

♂ genitalia (Text-fig. 80).

Apart from the type series I have seen only one other specimen from Nigeria which I would place in this species.

Material studied. NIGERIA: Lagos, Ajoute, 1 ♂, 24.i.59 (*C. H. Andrewes*).

However, the following specimens are doubtfully placed here.

GHANA: Aburi, 1,400 ft., 1 ♀, xii.1941 (*K. M. Guichard*). LIBERIA: Cape Mount Co. Dia.

Paralimna (Paralimna) nebulosa Wirth

(Text-figs. 48, 77)

Paralimna nebulosa Wirth, 1955 : 53.

Very closely related to *Paralimna lynx* Cresson, but with consistent differences sufficient to warrant separate status. As Wirth states in his discussion of this species, *Paralimna lynx* Cresson has the pleura entirely brown, only partially so in *Paralimna nebulosa* Wirth, facials longer, almost meeting in the mid-line, the cheeks only a fourth as broad as height of head and the wings uniformly tinged with brown. In this species all the veins are heavily infumated along their lengths. The carinal protuberance in this species is far larger than that of *Paralimna lynx* Cresson.

Easily distinguished by high, dark grey face, long facial and buccal bristles, dark buccae and pleura, with grey dorsal one third of mesopleuron and lateral edge of mesonotum. Wing veins strongly marked in Kenyan specimens, less strongly so in Ugandan, a darker brown cloud over apex of marginal and submarginal cells. Male genitalia (Text-figs. 48, 77). Full description by Wirth.

Material Studied. UGANDA: Bwamba Pass (West Side), Ruwenzori Range, 5,500–7,500 ft., 3 ♀, xii.1934–i.1935 (*F. W. Edwards*). KENYA: Teita Hills (S), 20 ♀, viii.47. (*Van Someren*).

Paralimna* (*Paralimna*) *pokuma Cresson **sp. rev.**

(Text-figs. 47, 75)

Paralimna pokuma Cresson, 1933 : 32.
Paralimna pokuma Cresson; Cresson, 1947 : 110.
Paralimna pokuma Cresson; Soika, 1956*a* : 493.

Both Cresson, 1947, and Soika, 1956, have synonymized this species with *Paralimna nidor* Cresson, on the size and colour of the female type specimen, Cresson calling it ' a large, long faced *Paralimna nidor* '. In the British Museum, (Natural History) I have found a further three specimens, two females, and one male, and the fore femora of the latter specimen has a well developed series of long, weak, flattened bristles, thus showing it to be a distinct species.

A very large species which, with its heavily infumated wings, dark brown buccae and pleura, and male fore femoral comb, should not be easily confused. I consider it to be more closely related to the *Paralimna arabica* species group.

♂. *Head:* antennal segments I and II dark, segment III elongate, with dense short brown pubescence and long sparse white pubescence. Arista with fourteen lateral hairs. Face with dark golden brown dusting. Some grey dusting on parafacials and below facial series. Two to three strong bristles and numerous fine hairs make up the broad facial series. One long and three short porrect buccal bristles plus numerous short setulae. Buccae brown. Frons lighter than face, more golden yellow to brown, areas around bristles darker brown.

Thorax: mesonotum pale brown, almost totally obscured by darker brown vittae and scattered brown areas; lateral areas, humeral callosities and dorsal third of mesopleuron grey to grey-brown. Metapleuron grey, rest of pleura, excepting the dorsal half of mesopleuron dark brown.

All tarsi pale, rest of legs blackish brown with a light grey dusting. Twelve to thirteen weak, relatively long, slightly flattened bristles in anteroventral series on fore femora, apical one-sixth free from bristles.

Wing membrane pale brown, veins dark brown.

Abdomen: well developed grey and brown fasciated pattern, grey fasciae interrupted broadly by median brown vittae on last three visible segments.

♂ genitalia (Text-figs. 47, 75).

Length, male, 6·5 mm.

Material. GHANA: Ashanti, Obuasi, 2 ♀, 1 ♂, 7.viii.1907 (*W. M. Graham*), caught on mud in bush.

Paralimna (Paralimna) lamborni Cresson

Paralimna lamborni Cresson, 1947 : 111.

Described from a single female specimen and not subsequently recognized. Most closely related to *Paralimna nebulosa* Wirth but differs in its large size, uniformly darkened wings and paler fore tibiae.

Holotype ♀.

Head: antennae lacking, face with very prominent carina, facial bristles weak, set high on face, the most dorsal bristle stronger than the rest. Face brown except at lower angles, and between antennae, pale yellow to silver. Buccal bristle long, buccae dark brown. Frons dark brown with golden yellow patterning.

Thorax: most of pleura and mesonotum dark brown, a broad grey band along edge of mesonotum and mesopleuron, across base of wing and ' joining ' silver-grey lateral areas of abdominal grey fasciae.

All tarsi pale, fore tibiae paler than femur, rest of legs blackish brown.

Wings uniformly but palely infumated.

Abdomen: except on segment two, grey fasciae very reduced, only narrow strips. Laterally they expand to full width of segment and take a silver sheen.

Length, 6 mm.

Material studied, only the type specimen. TANZANIA: Moshi, 1 ♀, 3.v.1916 (*W. G. Lamborn*).

The *CONFLUENS*-species group

Strongly marked and usually with maculated wings. The median anterior frontal region is raised from the surrounding frons. The lateral anterior frontal angles are velvety black with or without a white pupil.

Paralimna (Paralimna) confluens Loew

(Pl. 1, figs. 3, 4, Text-figs. 57, 67)

Paralimna confluens Loew, 1862 : 13.
Paralimna ornatipennis Adams; Cresson, 1929 : 193.
Paralimna confluens Loew; Cresson, 1947 : 113.
Paralimna confluens Loew; Soika, 1956*a* : 495.

A common species, showing considerable variation in wing pattern. Most closely related to *Paralimna vansomereni* Cresson, and *Paralimna cressoni* sp. n., from which it is easily distinguished by means of the sub-marginal cell patterning of the wing (Pl. 1, figs. 3, 4).

Head: antennae black, segment III with pale pubescence. Arista with eleven lateral hairs. Face, epistoma and buccae silver-grey with golden overtones when viewed at an angle. One long weak bristle, one shorter bristle and a series of weak hairs in facial series. Facial carina well developed and with a longitudinal white bar between antennae. Frons with a pair of black, white pupilled spots on the anterior fronto-orbital angles, at the base of the antennae, median of which is a silvered area.

Thorax: grey, on the mesonotum three dark brown vittae and considerable brown marking laterally. Brown patches on the meso-, ptero- and sternopleura. Scutellum brown dorsally, laterally grey, except for brown apex.

Legs, dark blackish brown, tarsi more pale.

Wing variation considerable (Pl. 1, figs. 3, 4).

Abdomen: greyish green fasciae small, wedgelike and never extending for more than one-third the width of the segments.

Male genitalia (Text-figs. 57, 67).

The West African form is very much darker, blackish brown not russet, with pale fasciae on abdomen even further reduced. The facial series are reduced to a few hairs.

Material studied. CAMEROON: Tiko, 1 ♀, 1–5.ix.1935 (*F. Zumpt*), N.Y. CONGO: Elizabethville, 1 ♂, 8.iv.39 (*H. V. Bredo*) B.M.(N.H.); Rutshuru environs, 1 ♀, 3.xi.1937 (*J. Ghesquière*); Eala, 2 ♀, viii.1935 (*J. Ghesquière*); Rutshuru environs, 3 ♂, 3.xii.1937 (*J. Ghesquière*); Rutshuru, 1 ♂, 1 ♀, 7.v.37 Mission Prophylactique; Terr. de Kasongo, Riv. Lumami, 1 ♂, x–xii.1959 (*P. G. L. Benoit*); Kamogobe, (Sud Masisi), 1 ♂, 4.iii.36 (*L. Lippens*); Kwango, Kiniati-Yasa, 1 ♂, 15.ii.52 (*R. P. J. Ruelle*); Kasongo, 1 ♂, 1 ♀, viii.59 (*P. G. L. Benoit*); N. Lac Kivu, Rwanki, 2 ♂, 15.ii.52 (*J. V. Leroy*); Rutshuru, Fuku, 1 ♂, 1 ♀, 30.v.36 (*L. Lippens*); Terr. de Kasongo, grotte de Mwana-kusu, 1 ♀, 23–28.viii.57 (*P. G. L. Benoit*).

Paralimna (Paralimna) mackieae Cresson **sp. rev.**

(Pl. 1, fig. 8, Text-figs. 56, 68)

Paralimna mackieae Cresson, 1947 : 114.
Paralimna vansomereni Cresson; Soika, 1956*a* : 496.

Most easily distinguished from *Paralimna cressoni* sp. n. and *Paralimna vansomereni* Cresson, by presence of white areas on marginal and submarginal cells, sinuate hind supernumery cross vein half way between the other two, and smaller eyes.

Differs from the two closely related above mentioned species in the following way:

Variable amounts of dusting on anterior edge of frons but shiny black edge usually broad. Buccae almost as wide as vertical height of eyes. Brown undulating band between dorsal and ventral halves of face more distinct. Two to three stronger facials plus five to six short, weak, hairs. Variable amounts of brown on the buccae. Pleura predominantly grey, some brown on mesopleuron and sternopleuron. Fore coxae grey dusted, fore femoral comb of male, of shorter slightly flattened setae, widely spaced along complete apical three quarters of the anteroventral face. Wing pattern distinctive, membrane pale brown, darker over and around cross veins of which there are three, one intermediate between the anterior and posterior cross veins in the first posterior cell. There are two white areas in the marginal cell, and along the costal edge of the submarginal cell is broadly white (Pl. 1, fig. 8). Abdominal segment one brown, narrow grey fasciae on segments two to five, the grey being yellowish on the last two segments. Male genitalia (Text-figs. 56, 68).

Soika synonymized this species with *Paralimna vansomereni,* comparing the type of the latter with Cresson's description of the former, which tally on many points, but comparison of the types and much extra material convinces me that they are distinct species.

Known with certainty only from South Africa.

Material studied. The type and 1 paratype are now in the B.M.(N.H.), the other paratype is deposited in Philadelphia; all are in very poor condition.

South Africa: Port St. Johns, Pondoland, 2 ♀, 5–30.iv.1923 (*R. E. Turner*); Cape Province, George, 1 ♂, 2 ♀, 15–17.xi.1921 (*R. E. Turner*); Natal, Drakensberg, Forestry Reserve, Cathedral Peak, Little Berg Summits, Themeda grassland, 2 ♀ iii.1959 (*B. R.* and *P. J. Stuckenberg*); Port St. Johns, 4 ♂, 1 ♀, 20–25.xi.1961 (*B.* and *P. Stuckenberg*); E. Cape, Storms River Pass, Tsitsikana Range, indigenous forest, 3 ♂, 1 ♀, 12–13.x.1959 (*B.* and *P. Stuckenberg*); Cape Peninsula, Whitsand dunes, 1 ♂, 25–26.vii.1959 (*B.* and *P. Stuckenberg*); E. Cape Province, Karreedouw Mountains, W. of Humansdorp, 1 ♀, 14.x.1959 (*B.* and *P. Stuckenberg*).

The following two specimens from the Congo probably represent a new subspecies. The wing has the marginal cells without pattern and lacks the adventitious cross vein. As both specimens are in very poor condition I refrain from describing this subspecies as new until further material be obtained. They would key out to *Paralimna vansomereni* in the key to species.

Congo: Rutshuru, 1 ♂, 1 ♀, 6.xii.1937 (*J. Ghesquière*), I.R.S.N.

Paralimna (Paralimna) vansomereni Cresson

(Pl. 1, fig. 6, Text-figs. 55, 66)

Paralimna vansomereni Cresson, 1933 : 25.
Paralimna vansomereni Cresson; Cresson, 1947 : 114.
Paralimna vansomereni Cresson; Soika, 1956*a* : 496.

May be distinguished from *Paralimna cressoni* sp. n. and *Paralimna mackieae* Cresson, by means of the wing pattern, pale but not intense white areas, neither dark nor pale areas extend on to marginal or submarginal cells except where darkened adventitious veins arise, and abdominal pattern where the grey fasciae are greatly reduced. A Central and East African species recorded from the Congo, Uganda and Kenya and Tanganyika. The type appears to be teneral.

The following brief description is intended to accentuate the points of comparison of this with related species.

Frons without the black dusted circular area anterior to the ocellar triangle. Facial and buccal bristles weak, proclinate, antero-fronto-orbitals weak.

Fore femoral male comb, consisting of weak, only partially flattened, setae over the majority of the anteroventral face.

Mesonotum less strongly darkened with brown. Considerable areas of brown on pleura.

Wing membrane pale brown with darkening over the cross veins, the middle cross vein as represented in *Paralimna mackieae* Cresson, is here a short vertical extension from the fourth longitudinal vein. Around the darkened veins are small areas of white, but not the solid intense white of *Paralimna mackieae* Cresson. (Pl. 1, fig. 6).

Abdomen dark brown with narrow incomplete grey-green fasciae on the posterior edges of the segments. Male genitalia, Text-figures 55, 66.

Material studied. The Tanzanian specimen is of particular interest, being the most southerly recorded specimen of this species, showing increased contrast between the light and dark areas of the wings, but no extension of the pattern on to the marginal and submarginal cells.

KENYA: Teita Hills, 8 ex., viii.47 (*Van Someren*). CONGO: Urundi, Bururi, 2 ♂, 1 ♀, x.1948 (*F. Francois*); Urundi, Bururi, 3 ♀, 1949 (*F. François*). UGANDA: Ruwenzori Range, Namwamba valley, 6,500 ft., xii.1934–i.1935 (*F. W. Edwards*); Ruwenzori Range, 6,000 ft., 1 ex., vii.45 (*Van Someren*). TANZANIA: Njombe, 6,000–6,500 ft., 1 ♂, 16.x.57 (*W.P.*).

***Paralimna* (*Paralimna*) *cressoni* sp. n.**

(Pl. 1, figs. 5, 6, 8, Text-fig. 70)

Closely related to the mainland species of *Paralimna vansomereni* Cresson and *Paralimna mackieae* Cresson, but specifically distinct from both (Pl. 1, figs. 5, 6, 8). Eyes larger and more bulbous than either of the mainland species, fore femoral anteroventral bristle series of male slightly longer than that of *Paralimna mackieae* and facial series of bristles considerably weaker than *Paralimna mackieae.*

♂. *Head:* antennae totally black, segment III with long pale pubescence. Arista with ten lateral hairs. Ventral half of face, below facials, grey, central carina with white dorsal patch upper half yellow with large brown patches. Buccae silver-grey. One or two strong facials, dorsal two thirds stronger than lower, plus seven to eight short weak hairs. Two buccal bristles, lower two thirds length and strength of dorsal, eight to ten short aggregated bristles. Frons fronto-orbital angles velvet-black with white pupil, black delimited both anteriorly and posteriorly by golden yellow. Anterior frontal edge only narrowly shiny black. Posterior orbital bristle considerably weaker and shorter than anterior bristle.

Thorax: golden yellow ground colour almost obliterated by the brown of vittae and irrorations. Pleura brown with a grey irregular band from the propleuron to the metapleuron passing through the middle of the mesopleuron.

Legs: tarsi pale, rest of legs dark. Fore femoral male comb, fourteen to sixteen short slightly flattened bristles over the central half of the femur. Anteroventral face of fore tibia strongly silver dusted.

Wings: membrane pale brown with darker vertical bars in first posterior cell separated by white areas. Subcostal, marginal and submarginal cells without white pattern nor, in most specimens, darker patches. In some, adventitious short veins are heavily pigmented. Dark patches in the first posterior cell may or may not be centred around adventitious veins. Discal and second posterior cells with irregular white patch, third posterior cell may have darkened centre. While the pattern of brown and white bars is irregular, they never extend on to the submarginal, cf. *Paralimna mackieae.*

Abdomen: segment one dark brown, segment two grey-green with narrow anterior brown fasciae just delimited by pale brown. Segments three and four with narrow grey fasciae, segment five with only lateral grey dusting.

Male external clasper (Text-fig. 70).

Holotype ♂. MADAGASCAR: D-S, Mtge. d'Ambre, 12.v.58 (*F. Keiser*).

Paratypes, data as type, 12 ♂, 13 ♀; locality as type, 8 ♂, 13 ♀, 26.v.58; locality as type, 2 ♂, 20 ♀, 21.v.58; Joffreville, 2 ♀, 25.v.58 (*F. Keiser*); Joffreville, 1 ♂, 9.v.58; Joffreville, 3 ♂, 5 ♀, 10.v.58; Joffreville, 1 ♂, 13.v.58; Tam, Perinet, 1 ♂, 2 ♀, 2.x.58 (*F. Keiser*); Tam, Perinet, 1 ♂, 6.x.58 (*F. Keiser*); Nord, Montagne d'Ambre, 1,000 m., dct. Diégo Suarez, 5 ♂, 9 ♀, 23.xi–4.xii.58 (*B. Stuckenberg*); Mt. d'Ambre, 1 ♂, 1 ♀, xii.48 (*R.P.*), Inst. Scient. Mad.

Type to Basle, plus seventy paratypes; 7 ♂ and 8 ♀ to B.M.(N.H.).

Paralimna* (*Paralimna*) *approximata Cresson

(Pl. 1, fig. 7, Text-figs. 53–65)

Paralimna approximata Cresson, 1947 : 115.
Paralimna ? confluens Loew; Soika, 1956*b* : 499.

A large distinctive species of the *Paralimna confluens* species group, easily distinguishable by means of size and large dark brown wings with numerous niveous patches. Recorded only from the Cameroons. Not a variety of *Paralimna confluens* as suspected by Soika (1956*b* : 499); the genitalia of the male are quite distinct (Text-figs. 53, 65).

♂. *Head:* face with a pronounced carina, only ventral edge of face grey, remainder of face pale yellow with dark brown mottling. One to two strong facials and five to six short weak hairs in facial series. Buccae brown, bristle large and strong, numerous setulae. Frontal niveous pupils equidistant between orbits. Anterior fronto-orbital bristle reduced to a weak setula only slightly longer than posterior fronto-orbital bristle. Brown area around vertical bristles extends on to occiput as two narrow vertical bands.

Thorax: mesonotum predominantly dark brown with scattered patches of yellowish brown. Two rows of acrostichals preceded by a pair of narrow yellowish vittae extending only as far as first dorsocentral. Scutellum brown. Pleura dark brown apart from an irregular grey band passing from propleuron to metapleuron along base of wing.

Legs: All tarsi pale, rest of legs dark blackish brown.

Wings large and rounded, strongly patterned (Pl. 1, fig. 7).

Abdomen: dark brown with narrow golden yellow to greenish yellow fasciae, latter complete on segments two and three only, final two segments appreciably darker.

Length 4·5–6 mm.

Material studied. Following specimens taken by sweeping, beating or at light:

CAMEROUN: Onyanga, 8,100 ft., 21.i.1932 (*M. Steele*); Musake, 6,350 ft., 8, 9, 13.i.1932 (*M. Steele*); Bamenda Hosp., 4,800 ft., 1 ex., 7.xii.1937 (*M. D. W. Jeffreys*); ' along Kumba Mumfe Road ' 1 ex. (*A. Zahra*).

Paralimna* (*Paralimna*) *pupulata Cresson

(Text-figs. 51, 63)

Paralimna pupulata Cresson, 1939 : 9.
Paralimna pupulata Cresson; Cresson, 1947 : 113.
Paralimna pupulata Cresson; Soika, 1956*a* : 497.

This species appears to be confined to a wide ' belt ' east to west across tropical Africa with a distribution from N. Nigeria through the Congo to Kenya in the east.

An easily distinguished species, without wing pattern but having the typical head colouration and patterning of a member of the *Paralimna confluens* group. The body colouring is predominantly black with varying amounts, usually slight, of paler dusting on face and pleura. It could only be confused with *Paralimna basilewskyi* Soika, but is considerably larger, with more dusting and a fully formed fasciated abdominal pattern. The median mesofrons shining and not dull and crenulate as in *Paralimna basilewskyi* Soika.

Head: the frons dark with velvet-black areas extending from fronto-orbital angle to base of frontal bristles, delimited anteriorly and posteriorly with silvered areas and with a niveous spot on the anterior edge of frons close to base of antennae. The niveous spot equidistant from the orbits. Vertex with light, brown dusting. Fronto-orbitals weakly developed. Face lightly dusted with silver-white, buccae similar. On most specimens a rubbed shining area below eye. Facials, two strong and three to four weak, bristles. Buccal bristle weak and short, plus scattered setulae on buccae.

Thorax: dark black-brown with four interrupted grey vittae between the dorsocentrals; further supra-alar and presutural patches of grey. Pleura lightly grey dusted.

Legs dark with light grey dusting, tarsi pale, fore tarsi only slightly paler than tibiae. Weak male fore femoral comb. Scutellum grey at tip, dark velvet blackish brown at base.

Wings with veins and membrane pale yellowish brown.

Abdomen: narrow grey-green fasciae on posterior edge of abdominal segments interrupted medianly by the median brown vitta on all segments. Female, median brown abdominal vitta narrower than male.

Male genitalia (Text-figs. 51, 63).

Material studied. UGANDA: Ruwenzori Range, Kyarumba, 4,500 ft., 1 ♀, xii.1934–i.1935 (*D. R. Buxton*); Ruwenzori Range, Kilembe, 4,500 ft., 6 ♂, 3 ♀, xii.1934–i.1935 (*F. W. Edwards*); Mt. Elgon, between Butandiga and Bulambuli, 8,000 ft., 2 ♂, 4 ♀, 7.viii.1934 (*J. Ford*); Ruwenzori Range, Fort Portal, 2 ♀, 4.xii.1934 (*F. W. Edwards*); Budongo Forest, 1 ♂, 7.ii.1935 (*F. W. Edwards*); West Nile Distr., Paidha, 1 ♀, 20–24.x.64 (*R. W. Crosskey*). KENYA: Teita Hills (S), 1 ♀, viii.47 (*Van Someren*); Ngong, 1 ♀, vi.1936 (*Van Someren*); Trans-Nzoia Dist., Nr. Cherangari Hills, 40 m. E. of Mt. Elgon, 6,200 ft., 1 ♂, 1 ♀, 6–9.ii.1925 (*C. R. S. Pitman*). NIGERIA: Zungeru, 1 ♂, 1 ♀, 14–15.xi.1910 (*J. W. S. Macfie*); Kateri, 1 ♀, 2.xii.10 (*J. V. Simpson*). MADAGASCAR: Sambirano, Lokobe, Nossi-Bé, 6 m., 8 ♂, 6 ♀, 9–23.xi.57 (*B. Stuckenberg*). CONGO: Rutshuru, 2 ♂, 1 ♀, i.37 (*J. Ghesquière*), I.R.S.N.; Kamogobe (Sud Masisi), 2 ♂, 4 ♀, 4.iii.36 (*L. Lippens*); Terr. Rutshuru, 1 ♂, 1 ♀, 7.iv.37, Mission Prophylactique; Terr. Rutshuru, 1 ♀, 7.v.37, Mission Prophylactique; Terr. Rutshuru, 1 ♀, 30.vii.37, Mission Prophylactique; Terr. Rutshuru, 13.viii.37, Mission Prophylactique; N. Lac Kivu, Rwanki, 1 ♂, xii.1957 (*J. V. Leroy*); N. Kivu, riv. Kabarazo, 1 ♂, 12.v.36 (*L. Lippens*); Rutshuru, 1 ♂, 26.iv.36 (*L. Lippens*); Rutshuru, 1 ♂, 1 ♀, 19.iv.36 (*L. Lippens*); Rutshuru, 1 ♂, 1 ♀, 10.v.36 (*L. Lippens*); Rutshuru, 1 ♀, 11.v.36 (*L. Lippens*); Rutshuru, 2 ♀, 25.v.36 (*L. Lippens*). TANZANIA: Bundiki, Uluguru Mts., moy. Mgetu, 1,300 m., 1 ♀, 30.iv.–11.v.1967 (*P. Basilewsky* and *N. Leleup*).

Specimens from West Africa have wider frontal shiny areas, niveous spots obviously nearer orbits, tarsi paler, some brown on pleura.

Paralimna* (*Paralimna*) *basilewskyi Soika

(Text-fig. 64)

Paralimna basilewskyi Soika, 1956*a* : 497.

Differs from *Paralimna pupulata* Cresson, as follows:

Small size, antennal arista pale, head colour generally shining blackish brown, vertex with a little brown dusting around ocelli. Lower half of face very lightly dusted with silver-white. Frons anterior to front bristles velvet-black with niveous spot close to the base of each antenna, raised area between the spots rugulose. Fronto-orbital bristles very reduced. Epistome strongly white dusted. Buccae golden brown dusted. One strong facial, three to four reduced bristles.

Thorax and scutellum of similar colour to *Paralimna pupulata*.

Legs with pale tarsi, rest dark brown. Fore femora of male with a series of short, well spaced, flattened setae on anteroventral face.

Wings with membrane and veins pale yellowish brown.

Abdomen strongly dusted with dark orange-brown, narrow incomplete grey-green fasciae on segments three and four only.

Genitalia (Text-fig. 64).

♀ larger in size with better developed grey fasciated pattern on abdomen, and middle frons more strongly crenulate.

I have seen only the type male and four further specimens from the Congo and British Cameroons.

Material studied. CAMEROONS: Ngusi, 1 ♂, 4.xi.1949 (*H. Oldroyd*), and two further specimens. CONGO: Kamogobe (Sud Masisi), 1 ♀, 4.iii.36 (*L. Lippens*); Bassin Lukuga, 1 ♂, 1935 (*H. de Saeger*).

The *ALBONOTATA*-species group

Characterized by the flattened white area on the second antennal segment, and the strongly projecting face and frons.

Paralimna* (*Paralimna*) *albonotata Loew

(Text-figs. 39, 49, 72)

Paralimna albonotata Loew, 1862 : 13.
Paralimna albonotata Loew; Cresson, 1929 : 191.
Paralimna albonotata Loew; Cresson, 1947 : 113.
Paralimna albonotata Loew; Wirth, 1956 : 383.
Paralimna albonotata Loew; Soika, 1956*a* : 494.
Paralimna albonotata Loew; Wirth, 1960 : 394.

Not easily confused with any other Ethiopian species providing that the antennae are considered, due to the silver-white flattened area on the second antennal segment. This species is not closely related to any other Ethiopian species but to the predominantly Oriental species groups which bear niveal spots on the second segment and have the fronto-orbital angles patterned with velvety black and yellow.

The Ethiopian distribution of this species from the southern and eastern regions may suggest that it has been introduced from the east. It has not, however, been recorded from Madagascar nor the Seychelle Islands.

A large species with the following characters:

Head: antennae black, arista with eleven to twelve lateral hairs. Interfoveal carina golden, becoming grey, face grey with variable amounts of golden dust producing a distinct yellow tinge in some specimens. Two to four strong facials plus eight to ten short hairs in facial series. Buccae broad and grey, with only two to three small bristles plus a short and weak buccal bristle. Frons predominantly brown with some yellowish grey dusting. The area of the mesofrons, which is raised in the *confluens* species group, is obvious, but not raised in any way. The fronto-orbital angles are velvety black, delimited by grey. Fronto-orbital bristles strong.

Thorax: mesonotum buff-brown strongly irrorate and with two dark brown vittae between the dorsocentrals. Pleura predominantly grey.

Legs: tarsi pale, remainder of legs dark with dense grey dusting. Male fore femora with a weak series of anteroventral bristles, only slightly flattened and present only over the basal three quarters.

Wings hyaline, veins brown.

Abdomen: the brown fasciae marked and the grey fasciae incomplete on all but segment two, and divided in the mid line by a brown vitta.

♂ genitalia (Text-figs. 49, 72). Males generally smaller and more brown, with smaller eyes and weaker facials.

Material studied. SOUTH AFRICA: Zululand, Nagara Res. Lab., 3 ♂, 1 ♀, 1922 (*H. H. Curson*); Lr. Umfolosi Riv., 10 ♂, 15 ♀, 1922 (*H. H. Curson*); Natal, Weenen, 2 ♂, 2 ♀, xi.25 (*H. P. Thomasset*); E. Cape Prov., Kathberg, 4,000 ft., 1 ♂, 1 ♀, x.1932 (*R. E. Turner*); Orange F. State, Harrismith, 1 ♂, 1 ♀, 1–20.iii.1927; Natal, Estcourt, 1 ♀, viii–ix.1896 (*G. A. K. Marshall*); Mafeking, 1 ♂, 27.ii.1934 (*J. Ogilvie*); Basutoland, Maseru District, 5 ♂, 7 ♀, 4–13.i.63 (*B. & P. Stuckenberg*), Valley floor, old lands, 5,500 ft; Transvaal, Nelspruit, 2 ♀, xi.59 (*B. Stuckenberg*); Natal, Ahrens District, Nr. Lilani, 1 ♂, iv.62 (*B. & P. Stuckenberg*); E. Cape Prov., Barkly East Dist. LundeansNek., 1,925–2,100 m., 1 ♂, 1 ♀, 18.i.63 (*B. & P. Stuckenberg*); Basutoland, Maseru District, Maloti Mts., Bushmans Pass, 1 ♀, 8–14.i.63 (*B. & P. Stuckenberg*); Natal, Newcastle, 1 ♀, xii.1952; Pirie Forest, E.P., 4 ♀, 10.iii.53 (*B. Stuckenberg*); Natal, St. Helier Est., Nr. Hillcrest, 2 ♀, 20.xii.1954 (*B. Stuckenberg*); Grahamstown, 3 ♂, 7 ♀, 7.xii.52 (*B. Stuckenberg*), present in large numbers on mud in a dried up water hole; Pondoland, Bizana Dist., Umzamba mouth, 1 ♀, 25.xi.60 (*B. & P. Stuckenberg*); Natal, Umzimkulwana Valley, Orbi Gorge Reserve, 1 ♀, 21–28.xi.60 (*B. & P. Stuckenberg*). KENYA: Emali Range, 4,900 ft.–5,900 ft., 4 ♂, 1 ♀, ii.40 (*Sultan Hamud*).

The *WIRTHI*-species group

A single Ethiopian species most closely related to *Paralimna picta* Kertész. Both male and female have strong fore femoral armature, strongly spinose in the former.

***Paralimna* (*Paralimna*) *wirthi* sp. n.**

(Text-fig. 69)

A small slate grey and brown species, not closely allied to any other Ethiopian species, but showing most affinities to the Oriental *Paralimna picta* Kertész.

♂. *Head:* antennal segments I and II black, segment III grey with white pubescence. Arista with thirteen lateral hairs. Face slate-grey, rather sparsely pollinated medially, epistoma pale grey and interantennal carina golden dusted. One long curved facial and series of six to ten becoming progressively shorter and weaker. Palpi dark with grey dusting. Buccae pale grey with one strong porrect bristle and a few relatively strong setae. Frons uniformly dark brown, two dark blue-grey patches posterior to frontal suture. Frontal bristle inserted posterior to anterior fronto-orbital. Lower frons with numerous small curved hairs, parafacial and orbital strips around eye pale grey up to level of antennae.

Thorax: dark brown with two interrupted yellowish brown vittae along line of dorsocentrals. Laterally on mesonotum more erratic vittae and patches. Scutellum dark brown dorsally, grey at base laterally, apically brown. Dorsal margins of notopleuron etched in iridescent green. Dorsal third of mesopleuron brown grading into blue-grey on lower half. Remainder of pleura blue-grey. Halteres reddish yellow basally, club yellow.

Legs: fore legs, coxae and femora grey, latter with an anteroventral row of short slightly curved and flattened bristles and a ventral and posteroventral rows of longer, equal to width of femur, distinctly pointed and closely set bristles. Tibia dark brown, paler apically. Tarsi reddish brown, ventrally with a golden brush of setae. Middle and hind legs, femora blue-grey laterally, dark brown dorsally, tibiae and mid tarsi dark, while hind tarsi are pale.

Wings uniformly lightly infumated.

Abdomen: grey fasciae narrow and only on segment five do they extend more than one third the width of the segment.

♂ genitalia (Text-fig. 69).

♀, with the exception of fore femoral armature, very similar to male.

Holotype ♂. LIBERIA: Cape Mount Co., Dia-Sandy bank, 17–25.ii.53 (*C. Blickenstaff*), to U.S.N.M.

Paratypes. 8 ♂, 4 ♀ (*C. Blickenstaff*), U.S.N.M., from same locality. 2 ♂, 1 ♀ to B.M.(N.H.).

[***Paralimna fulvipes*** Bezzi]

Paralimna fulvipes Bezzi, 1908 : 387.

I have studied the type specimen in the Institute Royale des Sciences Naturelles, Brussels, and the specimen belongs to the genus *Hydrellia* **comb. n.** It is in very poor condition, with the antennae missing and the complete body covered in Lepidopteran scales.

Species Incerta

Paralimna dasycera Bezzi, 1908 : 108.

I have been unable to study the type of this species, but I suspect that it is conspecific with *P. arabica nubifer* Cresson. If this is the case it will have precedence over *P. arabica* and the latter will be relegated to synonymy.

OEDENOPS Becker

Oedenops Becker, 1903 : 178.

Type-species, *O. isis* Becker (mon.)

Erected by Becker (1908) to receive the species *Oedenops isis* Becker, characterized by small size, vertical face with prominent interfoveal protuberance and sexual dimorphism in colouration of head and thorax (Text-fig. 16), almost total lack of mesonotal setulae and, in Ethiopian species, the absence of sternopleural bristles. The latter character is not consistent in other geographical regions, and undescribed species from the Orient and Australia may have sternopleural bristles present, often differing between sexes of the same species. Great similarity in body form and colour may be seen between *Oedenops* and the rather aberrant new subgenus of *Paralimna*, *Oedenopiforma*. In the Ethiopian region as here delimited only three species are known to occur, and one, *Oedenops isis* Becker, described from Egypt, and not previously recorded from any other locality, is here recorded from Madagascar.

The male genitalia are of the typical Notiphiline pattern; the outer claspers are lightly fused medially and densely bristled. The aedeagus is simple, with a membranous penis and small parameres. The cerci are partially fused ventrally to the external claspers (Text-fig. 92). The species appear to have an Eastern distribution in the Ethiopian region, only reported, at present, from N.E. Africa, S.E. Africa and Madagascar, although being of rather cryptic habit are probably not often collected.

A key to the four species at present described in this genus is provided.

KEY TO SPECIES OF *OEDENOPS*

1 Antennae dark grey or black in both sexes, presutural bristle present 3

– Antennae pale yellow in both sexes, presutural bristle absent 2

2 Male frons and dorsal facial region deep reddish brown; female with dark brown dusting on mesonotum sparse and confined to area between dorsocentral bristles, face grey . . . . **aurantiacus** Soika (Madagascar) (p. 354)

– Male frons and dorsal facial region yellow; female, dense dark brown dusting on mesonotum, not confined to area between the dorsocentrals **isis** Becker (Egypt and Madagascar) (p. 355)

3 Male frons and dorsal facial region reddish brown, cheeks golden, female frons, buccae and face, especially latter, greyish yellow, two hairlike bristles to facial series . . . . **nudus** Coquillet (N. America)

– Male frons and face brown, cheeks silvery white; female with face and buccae, particularly latter, silver-grey, three hairlike bristles to facial series **afra** Wirth (S. Africa) (p. 355)

Oedenops aurantiacus Soika

(Text-figs. 16, 92)

Oedenops aurantiacus Soika, 1956*b* : 123.

This species is of most striking appearance, the male possessing a frons and dorsal facial region of intense reddish brown colour and of velvet texture, which characters, together with the pale antennae and legs, distinguish it from all other described species. Although I have not been able to see the type specimen, the latter still being in the possession of Soika, I am convinced that the original description was based on the male and not the female as stated.

♂. *Head:* frons apart from lateral orbital strips reddish brown velvet, vertex silvery grey, becoming yellow on orbital strips. Antennae pale, arista dark brown with four to five lateral hairs. Face reddish brown dorsally becoming bright golden yellow ventrally. Facial series of two short, weak, hairlike bristles. Buccae broad, pale golden yellow becoming grey posteriorly, buccal bristle weak, no scattered setulae, although two to three weak hairs inserted along ventral edge. Palpi pale.

Thorax: mesonotum grey, with the area between the dorsocentrals lightly dusted with yellow and extending on to scutellum, a few minute setulae between dorsocentrals and lateral to them. Pro-, meso- and pteropleura yellow, becoming grey ventrally. Posterior mesopleural bristles very short and weak. Sternopleuron grey with very light yellow dusting.

Legs pale, with some grey dusting on the base of the fore and mid femora, hind femora predominantly grey. The apical segments of tarsi slightly darkened. Mid femur with a posteroventral row of short curved bristles on the apical half.

Wings with hyaline membrane with slight milkiness on and around anal lobe. Veins pale brown. Halteres, reddish yellow on stem with white club.

Abdomen: grey without brown dusting and clothed in numerous short pale hairs. External claspers as Text-figure 92.

Length, 2–2·5 mm.

♀. Almost totally grey, with slight yellow dusting on frons and face, and yellow-brown dusting between the dorsocentrals of the mesonotum. All femora with more extensive grey dusting than male. Mid femur without the male comb of bristles.

Material studied. MADAGASCAR: Sud-Est, Sainte Luce, 10 m., dct. Fort Dauphin, 1 ♂, 1 ♀, 22–24.ii.58 (*B. Stuckenberg*); Fenerive, lagoon shore, 1 ♂, 1 ♀, xii.55 (*B. Stuckenberg*).

Oedenops afra Wirth

Oedenops afra Wirth, 1956 : 387.

The presence of a presutural bristle and dark antennae easily distinguishes this from the other Ethiopian species in the genus. The sternopleuron bears a short, weak hair which appears to represent the reduced sternopleural bristle present in *Paralimna*.

I have seen only one specimen and can add little to Wirth's description, apart from the above comments on the presutural bristle and sternopleural hair.

SOUTH AFRICA: Port St. Johns, 1 ♀, 20–25.xii.1961 (*B. & P. Stuckenberg*).

Oedenops isis Becker

(Text-fig. 96)

Oedenops isis Becker, 1903 : 178.
Oedenops nuda Coquillet; Cresson, 1929 : 183.
Oedenops isis Becker; Cresson, 1946 : 229.
Oedenops isis Becker; Cresson, 1947 : 108.

Apart from the original locality in Egypt and Cresson's reference to Sudanese specimens (Cresson, 1947 : 108), I can trace no other localities for this species. This fact makes the present recording of *Oedenops isis* from Madagascar seem unlikely and as the only specimen of *Oedenops isis* I have seen is the rather damaged female type, it may be that the Malagasy specimens are a new, closely related species. The following brief description is from a male of the Malagasy series.

♂. *Head:* antennae totally reddish yellow, arista dark with four to five lateral hairs. Face and frons an intense orange-yellow. Buccae greyish yellow. Only one short and weak bristle in facial series, and one bristle of similar size on the bucca. Both fronto-orbital bristles are present as very short bristles. Vertex greyish yellow with strong vertical, frontal and ocellar bristles. The postocular series very slight.

Thorax: metanotum grey with pale yellow dusting between the dorsocentrals. There are a few scattered setulae laterally on the mesonotum and a number of slightly longer hairs on the scutellum. The presutural bristle is lacking. Scutellum grey, yellow dusted on disc. Mesopleuron yellow, remainder of pleura grey. Mesopleuron with three to four weak hairlike bristles on the posterior edge.

Wing, membrane translucent, with pale brown veins.

Legs, pale with grey dusting on the coxae and tarsi, and the middle and hind femora. There is a row of tiny spines along the apical half of the anteroventral face of the fore femora.

Abdomen: totally grey with a short sparse pubescence.

Male genitalia as in Text-fig. 96.

♀ very similar to male, frons less intense orange-yellow, but mesonotum with darker orange-yellow dusting between the dorsocentrals and on humeral region.

Easily distinguished from *Oedenops aurantiacus* Soika by the lack of a reddish brown velvety frons in the male and the yellow face and frons instead of grey in the female.

Material studied. MADAGASCAR, Sud-Est: Sainto-Luce, 10 m., dct. Fort Dauphin, 2 ♂, 22–24.ii.58 (*B. Stuckenberg*); Sud-Ouest, Saint-Augustin, 6 m., dct. Tuléar, 1 ♀, 11–13.ii.58 (*B. Stuckenberg*); Fenerive, Lagoon shore, 1 ♀, xii.1955 (*B. Stuckenberg*).

KAREMA Cresson

Type-species, *Karema loewella* Cresson 1929 : 182. By orig. des.

A distinctive genus, known up to the present from the type-species alone. Apparently common throughout eastern and southern Africa and Madagascar (*K. flavipes* sp. n.). Easily distinguished from other Notiphiline genera by the following: dorsocentral, presutural and posterior notopleural bristles absent, ocellars and sternopleural reduced. Suggested by Cresson as a connectant between *Paralimna* and *Dryxo*, a suggestion I would endorse.

The genitalia are large and relatively complex, the external claspers are small, articulated with the epandrium in the normal fashion and also to a sclerotized ventral portion of the epandrial membrane. The aedeagus is large, the inner claspers loosely attached and variable in shape, the hypandrium well developed, partially sclerotized, and with strongly sclerotized projections (Text-fig. 91).

KEY TO SPECIES OF *KAREMA* CRESSON

1 All legs predominantly dark, the mid-femora totally grey dusted **loewella** Cresson (p. 357)

– All legs predominantly pale, reddish yellow, mid-femora totally pale ***flavipes*** sp. n. (p. 357)

Karema loewella Cresson

(Text-fig. 90)

Karema loewella Cresson, 1929 : 182.

Easily distinguished from *Karema flavipes* by darker legs, almost totally black, silver-grey mesopleuron and darker and less vittate mesonotum. The basal scutellar bristles are nearer the apical bristles and situated on the brown apical area of the scutellum. The brown abdominal fasciae extend over the anterior half of segments three to five only.

♂ *and* ♀: description as for *Karema flavipes* sp. n., but differs in the following manner:

Head: antennae dark, segment III with pale pubescence. Arista with thirteen lateral hairs. Face grey pollinose with considerable golden dust overlying. Buccae grey, golden dusting anteriorly and brown dusting posteriorly. Facial series of very weak hairs, with only one obvious member. One to two long weak buccal bristles and numerous weak hairs ventrally. Frons black medially, very lightly dusted with grey and brown.

Thorax: black, lightly dusted with brown dorsally, silver-grey laterally with some golden dusting on the mesopleuron, vittae of grey dusting usually obscure, except on some East African specimens. Scutellum dark brown, silver-grey basally on sides. Both pairs of scutellar bristles inserted in the brown apical area.

Coxae silver-grey and all tarsi slightly paler than rest of legs which are dark, often totally black. Dorsal face of tibiae and tarsi with at least some silver-grey dusting.

Wings, veins pale reddish yellow, membrane lightly infumated.

Abdomen: grey, with brown fasciae on anterior half of segments three to five and considerable brown dusting on segment one.

Aedeagus as Text-figure 90.

Material studied. MALAWI: Cholo, 1 ♂, 1 ♀ (*R. C. Wood*). SUDAN: W. Darfur, Jebel Marra, Killing, 7,000 ft., 1 ♂, 7.iv.1932 (*M. Steele*). NIGERIA: Zungeru, 4 ♂, 2 ♀, 4.iii.1911 (*J. W. S. Macfie*); Zungeru, 2 ♀, 15.iii.1911 (*J. W. S. Macfie*); Zungeru, 4 ♂, 23.ii.1911 (*J. W. S. Macfie*). SOUTH AFRICA: Zululand, Lr. Umfolosi Riv., 4 ♀, 1922 (*H. H. Curson*); Natal, Durban, 1 ♂, 26.iv.19 (*C. N. Barker*); Transvaal, Waterberg dct., 1 ♂, viii.48 (*O. Beyer*). CHAD: W. Goulem, 1 ♂, 8–9.x.58 (*G. B. Popov*). TANZANIA: Bukoba, 1 ♂, 10.iv.1912 (*C. C. Gowdey*). RHODESIA: L. Lundi River, Chipinda Pools, 1 ♀, 22.x.60 (*R. Goodier*).

***Karema flavipes* sp. n.**

(Text-figs. 10, 91)

Closely related to the mainland species but easily distinguished from it by its pale legs, the mid-femora being totally reddish yellow.

♂. *Head:* antennal segment II strongly silvered, arista with fourteen lateral hairs. Facial series approximately twelve hairs, with one slightly stronger member. Face strongly gold dusted, broader, less sharply carinate than *Karema loewella* Cresson. Mid-frons dark blackish brown. Pre-ocellar bristles strong, projecting beyond anterior edge of frons. Fronto-orbital bristles, one pair, strong, five to six short weak, hairlike bristles along orbital edge. Vertical bristles also strong, hairs in position of ' posterior verticals '.

Thorax: mesonotum, ground colour pale golden brown with grey laterally; two narrow brown median vittae, two broader interrupted brown vittae, interrupted at suture running laterally along line of dorsocentrals, the latter visible as weak hairlike bristles. Vittae broaden and fuse posteriorly. Pleura grey, posterior part of mesopleuron with strong golden sheen. One strong posterior mesopleural bristle, one weak sternopleural bristle and a median oblique line of hairs. Scutellum brown at apex, silver laterally, golden medianly on disc.

Legs pale apart from some dark dusting on fore and hind femora, apices of tibiae and last tarsal segments. Coxae silver. Relatively long hairs on fore femora.

Abdomen: abdominal segment one grey laterally, segment two with brown fascia interrupted laterally and medianly by silver-grey. Segments three and four grey, very narrow medially, broadening laterally. Segment five totally dark brown.

♂ genitalia as Text-figure 91.

Holotype ♂. MADAGASCAR: Est, Ambodivoangy, 20 m., dct. Maroansetra, 16–20.iii.58 (*B. Stuckengerg*), to N.M.

Paratypes. Same data as type, 1 ♂, 3 ♀. MADAGASCAR: Ouest, Ranohira, 860 m., 3 ♂ 7 ♀, 26.i–4.ii.58 (*B. Stuckenberg*); Est, Ivontaka, dct. Manara, 3 ♂, 5 ♀, 10–14.iii.58 (*B. Stuckenberg*); Sud, Sept Lacs, 100 m., dct. Tuléar, 4 ♂, 1 ♀, 13–16.ii.58 (*B. Stuckenberg*); Ranomafana, 1 ♀, xii.1955 (*B. Stuckenberg*); Est, Navana-Antongil, 6 m., dct. Maroansetra, 1 ♀, 20–25.iii.58 (*B. Stuckenberg*); Sambirano, Lokobe, Nossi-Bé, 6 m., 2 ♀, 9–23.xi.57 (*B. Stuckenberg*); Est, Sahasoa, Fanpanambo, 80 m., dct. Maroansetra, 1 ♂, 1 ♀, 26–29.iii.58 (*B. Stuckenberg*); Betroka, 1 ♂, 1.viii.48 (*A.R.*); Route to Majunga, Km. 530, 1 ♀, (*R.P.*).

Paratypes to N.M., apart from eight to B.M.(N.H.).

DRYXO Robineau-Desvoidy

Type-species, *Dryxo lispoidea* Robineau-Desvoidy, 1830 : 787. By monotypy. (Emend. from *lispoïdea*).

This genus contains the largest, in body size, of the known Ephydrids, and superficially does not appear to agree with the tribal diagnosis.

The genus is characterized by its large size, greater than 1 cm., and long legs, those of the male bearing long tarsal hairs. The frons is flat and protruding with reduced setation, only the vertical and postocellar bristles strongly developed. Face large with the facial series reduced or absent. Antennae and arista shortened, the latter always pale in Ethiopian species. One notopleural bristle inserted posteriorly and in two of the three species from this region there are a pair of posterior dorsocentral bristles. Middle tibiae with three short dorsal spines, two closely inserted basally, the third subapically. The wings have the costa extending to the fourth longitudinal vein, and the subcostal vein bears long ventral hairs at least on the node below the humeral cross vein, and usually along its length.

Only two previously described Ethiopian species, a third from Madagascar is described here. Very widespread in distribution and recorded from practically the whole of the region, including the Canary Islands. Genitalia of male basically similar to other members of the tribe, the aedeagus is large with complex parameric structures. The external claspers are large and supported by sclerotisation of the ventral edge of the epandrium (Text-fig. 93).

KEY TO THE ETHIOPIAN SPECIES OF *DRYXO* ROBINEAU-DESVOIDY

1 Head, thorax and abdomen uniformly buff-brown pollinose, lacking a facial series and with a strong pair of prescutellar dorsocentral bristles . **woodi** Cresson (p. 362)

– Head, thorax and abdomen not uniformly buff-brown, facial series of hairlike bristles present, and dorsocentrals weak or absent 2

2 Humeral bristle absent; fifth abdominal segment totally dark, usually one pair of very weak and short prescutellar dorsocentrals . . **margaretae** sp. n. (p. 360)

– Humeral bristle present; fifth abdominal segment not totally dark brown, usually no trace of prescutellar dorsocentrals . . . . . **ornata** Macquart (p. 359)

Dryxo ornata (Macquart)

(Text-fig. 93)

Blepharitarsis ornatus Macquart, 1843 : 411.
Corythophora longipes Loew, 1862 : 13.
Dryxo ornata (Macquart) Bezzi, 1908 : 194.
Dryxo ornata (Macquart); Cresson, 1929 : 181.
Dryxo ornata (Macquart); Soika, 1956*a*
Dryxo ornata (Macquart); Wirth, 1960 : 393.

A widespread species of highly variable size and colour. Specimens from the Arabian peninsular being paler, more grey with the dorsal abdominal pattern less distinct, the darker fasciae reduced. Material from central Ethiopian regions are invariably darker with wings lightly infumated.

Easily distinguished from the other African species by the characters given in the key, namely the presence of a humeral bristle, and a fasciated abdominal pattern, and the absence of any sign of dorsocentral bristles.

♂. *Head:* antennae dark, segments I and II with grey dusting. Arista pale with fourteen to sixteen lateral hairs, apparently in two rows. Face, parafacial region, and buccae silver-grey, ' eye stripe ' dark brown. Frons pale golden yellow, slightly darker on the vertex. Facial series of five or six weak but relatively long hairlike bristles plus a ventral extension of numerous weak hairs. Buccal bristle short.

Thorax: predominantly grey, extensive irroration of the mesonotum with dark brown, the scutellum being dark brown latero-apically. There is rarely any indication of the posterior pair of dorsocentral bristles.

Legs pale with varying amounts of grey dusting, especially on the fore femora and coxae. Hind first and second tarsal segments with long dorsal black hairs.

Wings, membrane hyaline, veins pale brown. The first subcostal section has a ventral row of long hairs, while the dorsal surface of the first longitudinal vein carries a number of short, widely spaced, curved bristles along its second section. The lower calyptrae are well developed and fringed with dense long white hairs. The haltere club is yellow.

Abdomen: predominantly grey, with varying amounts of brown depending on the geographical region. The brown fasciae reach their largest size in specimens from Eastern and Central Africa. Segment two has only small lateral brown areas, the latter bearing long bristles.

♂ claspers as Text-fig. 93.

Material studied. CONGO: L. Tanganyika, Luebe, Nr. Baraka, 2 ex., 31, 20.iv. 27 (*R. Bois*); L.S.T.M. CONGO FREE STATE: Matadi, 2 ex., 18.xi.1903 (*Dutton, Todd* and *Christy*). NIGERIA: Ilorin, 29 ex., 21.ii.1912 (*J. W. S. Macfie*); Alagua, 5 ex., 1912 (*J. W. S. Macfie*); Zungeru, 80 ex., ii.1912 (*J. W. S. Macfie*). SIERRA LEONE: Kaniki, 2 ex., 22.v.1912 (*J. J. Simpson*); Kayima, 1 ex., 29.vi.1912 (*J. J. Simpson*); Lungi, 1 ex., 14.vii.1959 (*C. P. Hoyt*). GHANA: N. Territories, Yapi, 21 ex., iii.1916 (*J. J. Simpson*); Kpong, 1 ex., iv.1922 (*J. W. S. Macfie*); Koforidua, 2 ex., iv.1921 (*J. F. Corson*). CHAD: W. Goulem, 1 ex., 8–9.x.58 (*G. B. Popov*). W. ADEN PROT.: Jebel Harir, 5,200 ft., 4 ex., 26.x–6.xi.1937. SOMALIA: Hargeisa, 2 ex., v.1949 (*K. M. Guichard*); Bohotle, 2 ex., 1903 (*A. F. Appleton*). SUDAN: W. Darfur, Jebel Marra, Killing, 7,000 ft., 3 ex., 7.iv.1932 (*M. Steele*). S. W. AFRICA: Satansplatz, 1,300 m., 1 ex., 17–18.xii.1933 (*K. Jordan*). MALAWI: Central Angoniland, 6 ex. (*R. Limpembe*); Kota Kota, 2 ex., 13.ix.1919 (*W. A. Lamborn*); Cholo, 6 ex. (*R. C. Wood*); Lake shore, 1 ex., 4.viii.1909 (*J. B. Davey*); Chisi, Nr. Nkata Bay, 1 ex., 15.x.1908 (*J. B. Davey*). ZAMBIA: Kaful, 1 ex., 1.ix.13 (*R. C. Wood*); Luangwa Valley, 1 ex., 17.ix.1910 (*M. Juvia*). TANZANIA: T. Kigoma, 1 ex., 31.viii.1931 (*J. Ogilvie*); Bukoba, 8 ex., 10.vi.1912 (*C. C. Gowdey*); Old Shinyanga, 4 ex., 29.x.52 (*E. Burtt*); Zanzibar, Chukusani, 1 ex., 12.ix.11 (*W. M. Adero*). KENYA: Tana Bridge, 9 ex., 1–2.vii.48; Voi, 1,800 ft., 1 ex., 21–23.iii.1911 (*S. A. Neave*). RHODESIA: Lower Lundi, Chipinda Pools, 7 ex., 22.x.1960 (*R. Goodier*). UGANDA: Entebbe, 24 ex., 16.vi.1912 (*C. C. Gowdey*); 3 ex., 1903 (*D. Bruce*); Ruwenzori Range, Kilembe, 4,500 ft., 1 ex., xii.1934–i.1935 (*F. W. Edwards*).

***Dryxo margaretae* sp. n.**

(Text-figs. 15, 94)

Very closely related to *Dryxo ornata*, differing most noticeably in abdominal pattern but also lacking the humeral bristle (in the manner of *Cyphops*).

The following description refers only to points of comparison between this species and *Dryxo ornata*.

Antennae more grey dusted, facial series of hairs slightly shorter (Text-fig. 15). Vertex more strongly marked with orange-brown, orbital bristles stronger. Humeral bristle absent, notopleural bristle more posterior, two short hairs on posterior edge of notopleuron. Weak bristles on posterior edge of mesopleuron, stronger than in *Dryxo ornata*. Grey area at base of scutellum larger and bare of setulae, grey apical area less obvious. All legs darker, grey dusting denser, long black hairs on hind metatarsi, only arising from apex of segment not apical half.

Abdomen, segment one totally grey, segment two brown fasciae interrupted in the middle by broad grey area. Segments three and four grey only laterally, dark brown and shining over majority of segment. Small grey area in middle of segment on anterior edge, grey area bare of setulae. Segment five reversed situation, grey anteriorly and brown posteriorly.

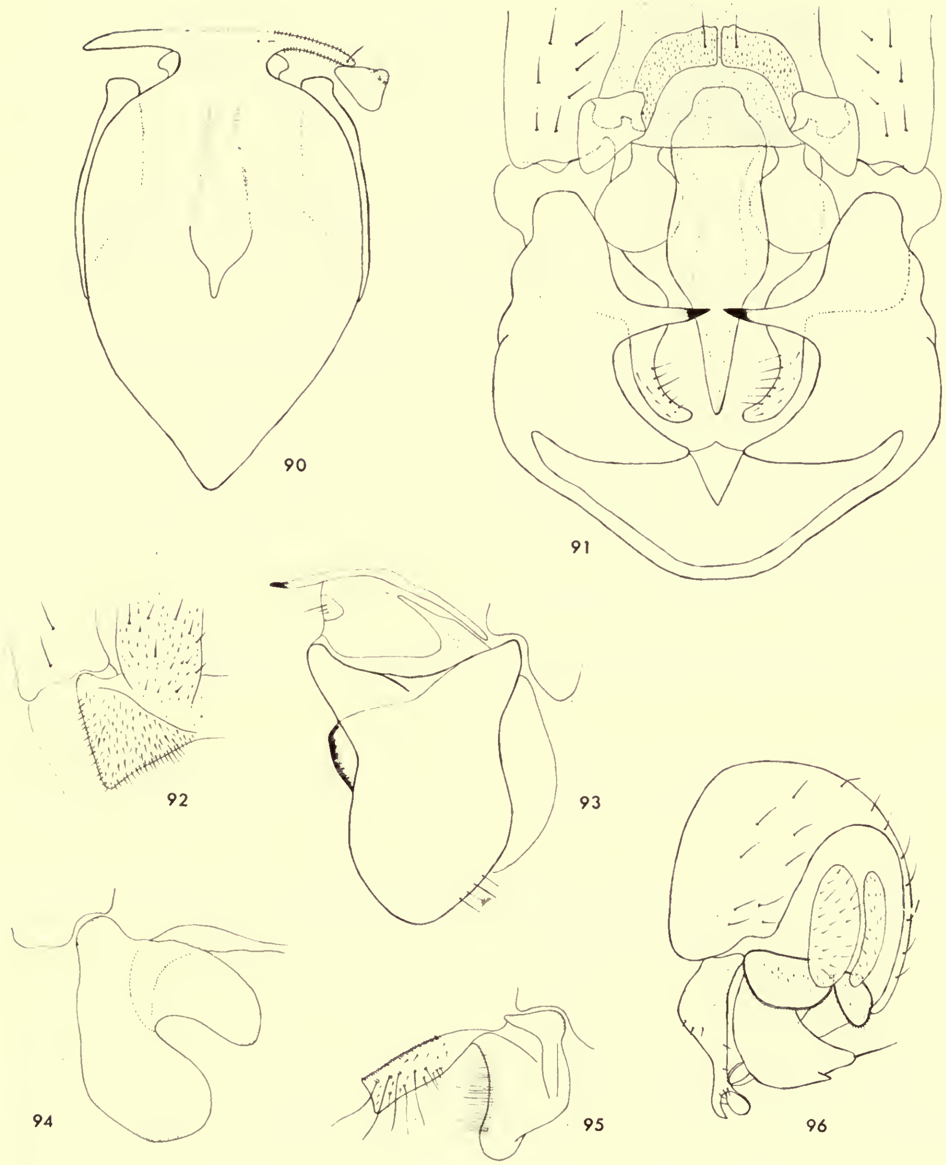
Male external claspers as Text-figure 94.

Material studied. Holotype ♂. MADAGASCAR: Est, Sakasoa Fampanambo, 80 m., dct. Maroansetra, 26–29.iii.58 (*B. Stuckenberg*), to N.M.

Paratypes. 1 ♂, 1 ♀ as above.

MADAGASCAR: Perinet, 2 ♂, xii.1955 (*B. Stuckenberg*); Moramanga Dist., Niagarakely Forest, 1 ♀, xii.1955 (*B. Stuckenberg*).

One male and one female paratype to B.M.(N.H.).



FIGS. 90–96. 90, *Karema loewella* Cresson, aedeagus; 91, *K. flavipes* sp n., hypandrium and associated structures; 92–95, ♂ external claspers: 92, *Oedenops aurantiacus* Soika; 93, *Dryxo ornata* Macquart; 94, *D. margaretae* sp. n.; 95, *D. woodi* Cresson; 96, *Oedenops isis* Becker, ventro-lateral view of ♂ genitalia.

Dryxo woodi Cresson

(Text-fig. 95)

Dryxo woodi Cresson, 1936 : 266.

Easily distinguished species possessing buff coloured vestiture and completely pale legs, the facial series and sternopleural fan of hairs are very reduced.

♂ and ♀. *Head:* antennal segments I and II pale with very short dorsal spine, segment III grey dusted and darker. Arista pale with twelve to thirteen lateral hairs. Face, parafacials and buccae whitish grey with some pale brown dusting. Facial series and buccal bristles reduced to very fine hairs. Frons uniformly setulose, with some indications of stronger setae in position of pre-ocellars, postocellars and orbitals. Vertical bristles short but strong. Pale grey anteriorly to pale brown posteriorly, para-orbital strips grey.

Thorax: mesonotum grey, anteriorly pale brown on humeri and becoming darker posteriorly. Humeral, pre-alar, supra-alar, prescutellar and four scutellar bristles present. General covering of mesonotal setulae, occasionally stronger in positions of reduced dorsocentrals. Two areas bare of setulae flanking the anterior third of acrostichal region. Mesopleurae grey, brown dusting only in anterior dorsal corner of mesopleuron and just ventral to wing attachment. Sternopleuron with dorsal fan of weak hairs.

Legs totally pale reddish yellow with general light, white dusting. No long hind metatarsal hairs.

Wings with hyaline membrane and pale veins. First vein bare dorsally and with very reduced white hairs ventrally.

♂ genitalia, external claspers as in Text-fig. 95.

Material studied. Only the original type series from Nyasaland.

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APPENDIX

The following description was accidentally omitted from the copy submitted for publication. [Ed.]

Notiphila (*Notiphila*) *stuckenbergi* sp. n.

(Text-figs. 13 and 24)

♂ and ♀. *Head:* Arista with ten lateral hairs. Face golden-yellow dusted, fading gradually to yellow-grey on cheeks, and to grey on post-buccal region. Facial carina rounded, broadening below, sloping strongly to oral margin. Ventral hairs on ant. seg. II half as long as on seg. III. Most dorsal of facial bristle-series long, weak, curved; second bristle long, hair-like, third strongest of series, but median gap between bristle-tips as wide as a single bristle-length; two weaker bristles up to mouth-margin. Buccal bristles separated by bare area from facial series, large lower buccal bristle about third of head-width. Post-buccal bristles short and closely adpressed, in few irregular rows, reducing to three and then one row above; one relatively long, four times length of buccal bristles; a weak hair projecting posteriorly from the extreme post-buccal region. Palpi white dorsally, to pale yellow ventro-basally; peristomum testaceous with light grey dusting. Fronto-orbital plates buff anteriorly at edges adjacent to eye, darker brown interiorly and posteriorly, five to six short very weak orbital hairs. Frons divided into two halves by a pale brown band from ocellar hump to lunula; both halves dark brown, iridescent dark green when viewed at an angle. Fronto-orbital and verticals all long and strong; *vte* half length of *vti*. Anterior of the three pairs of post-ocellars relatively strong, about third length of pre-ocellars. Final bristles of post-orbital series three times length of others.

Thorax: All large bristles arising from brown irrorations, and *ph* from the brown lateral vittae. Thorax basically buff with very pale green undertones, with two pale rather indistinct brown vittae on mid-line, and a lateral irregular darker brown band from *ph* to base of scutellum. Notopleuron in dorsal half and thoracic suture dark brown, anterior bristle dark brown at base. Mesopleuron with a large central dark brown patch, olive-brown ground-colour as on mesonotum; wholly covered with short hairs. Pteropleuron with one long bristle and five to six short hairs. Metapleuron olive-brown. Scutellum coloured as thorax, with numerous weak hairs on disc and two slightly stronger on sides between apical and basal bristles; basal much longer than apical pair, latter crossing about halfway along their length.

Legs: Pale, only femora dark. Fore femur with eight to nine *pv* setae, relatively weak, longest equal to femoral depth; apical half with mini-spines, fringe of fine hairs along complete length, internal face uniformly hairy, a slightly silvered patch at middle. Metatarsal brush short and dark. Mid femur with four *av* spines, one strong; apical half with a strong black *pv* comb. Ventral tibial comb of short setae on apical half. Hind femur with two *a* bristles strong. Metatarsal comb black, longer than tibial width, consisting of three spines, with internal brush of yellow hairs, finally becoming black over lower half.

Wings: Only slightly infumated, veins yellowish red. Spines on basicosta before humeral break, wider than cell below; one spine at base and two before break stronger than others. First costal section haired, becoming stronger before costal break. Costal spines equal to costal width, ventral costal hairs greater than costal width. Second costal section twice third. Hind cross-vein almost wholly straight. Knob of halteres pale yellow, stalk red-yellow.

Abdomen: Ground-colour olive-brown with large brown fasciae just reaching ventral edge of middle tergites and so delimiting a narrow complete pale stripe. Abdominal hairs all long, bristles strong. Four long preapical bristles on hind tergite. Three pairs of long bristles on ventral edge of penultimate tergite, greater than width of last segment. Bristles of ventral surface with a converging pair on last segment.

Holotype ♂. MADAGASCAR: Sud, Route d'Anosibe, 840 m., dct. Moramanga, 18–21.xii.57 (*B. Stuckenberg*). To N.M.

Paratypes. [*F.K.* = *F. Keiser; B.S.* = *B. Stuckenberg*.] MADAGASCAR: data as holotype, 1 ♂, 1 ♀; Maj., Amboromalandy, 4 ♂, 2 ♀, 2.vii.58 (*F.K.*); Tam., Tamatave, 1 ♂, 1.xi.58 (*F.K.*); Fia., Mananjary, 1 ♂, 13.viii.58 (*F.K.*); Tan., Tananarive, 2 ♂, 4 ♀, 14.vii–1.ix.58 (*F.K.*); Maj., Amberovy, 10 ♂, 29.vi.58 (*F.K.*); Tam., Soanierana-Ivongo, 3 ♀, 6 and 8.xi.57 (*F.K.*); Tan., Mahatsinjo, 2 ♀, 12.vi.58 (*F.K.*); Tam., Perinet, 5 ♀, 22.ix–6.x.58 (*F.K.*), and 2 ♀, xii.55 (*B.S.*); Maj., Ambongamaranitra, 4 ♀, 20.vi.58 (*F.K.*); Fia., Ambatolahy, 1 ♀, 14.ix.58 (*F.K.*); Tam., Andranofotey, 1 ♀, 1.v.58 (*F.K.*); Fia., Ifanadiana, 1 ♀, 22.viii.58 (*F.K.*); Tam., Moramanga, 1 ♀, 20.xii.57 (*F.K.*), and Route d'Anosibe, 1 ♀, 18–24.xii.57 (*B.S.*); Tan., Ampefy, Lac Kavitaha, 1 ♀, 23.iii.58 (*F.K.*); Nord, Montagne d'Ambre, 1,000 m., dct. Diego Suarez, 2 ♂, 2 ♀, 23.xi–4.xii.57 (*B.S.*); Nord, Diego Suarez, 30 m., 1 ♀, 4–9.xii.57 (*B.S.*); Est, Ivontaka, 15 m., dct. Mananara, 5 ♂, 13 ♀, 10–14.iii.58 (*B.S.*); Est, Antanambe, 8 m., 3 ♀, 1.iv.58 (*B.S.*); Centre, Station Agric. Alaotra, 800 m., dct. Ambatondrazaka, 2 ♀, 24.xii.57 (*B.S.*); Ranomafana, 2 ♂, 3 ♀, xii.55 (*B.S.*); Sambirano, Lokobe, Nossi Bé, 6 m., 1 ♀, 9–23.xi.57 (*B.S.*); Fenerive, on beach, xii.55 (*B.S.*); Sandrangato, 1 ♂, 1 ♀ (Inst. Scient. Mad.); Maroantsetra, 1 ♀ (Inst. Scient. Mad.). N.M., N.M.B., B.M.(N.H.).

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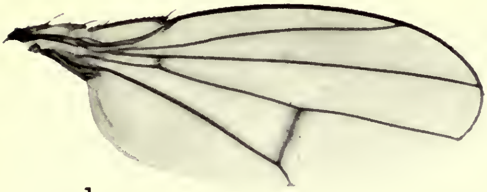
PLATE 1

Wings of 1, *P. limbata* Loew; 2, *P. reticulata* sp. n.; 3, *P. confluens* Loew; 4, *P. confluens* (West Africa); 5, *P. cressoni* sp. n.; 6, *P. vansomereni* Cresson; 7, *P. approximata* Cresson; 8, *P. mackieae* Cresson.



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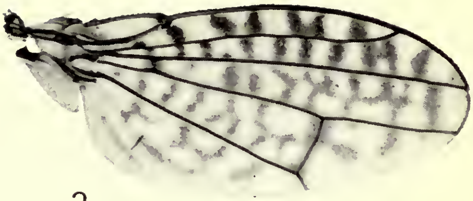

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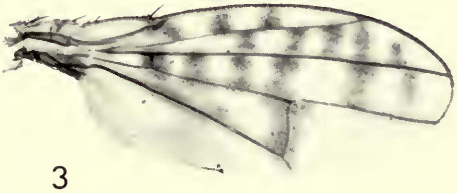

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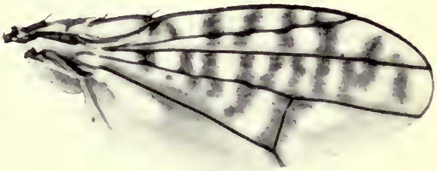

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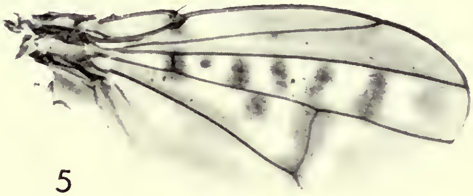

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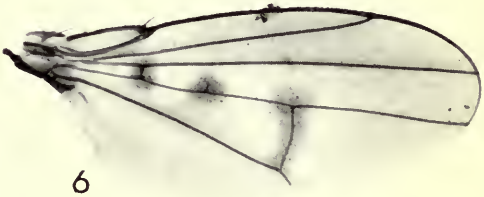

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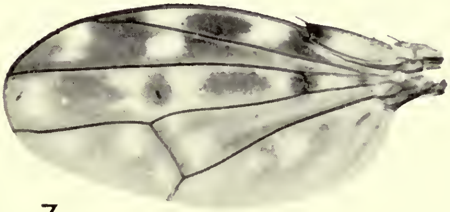

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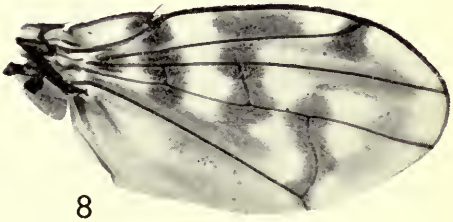

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THE *ALOEIDES THYRA* COMPLEX (LEPIDOPTERA : LYCAENIDAE)

G. E. TITE
and
C. G. C. DICKSON

BULLETIN OF
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ENTOMOLOGY Vol. 21 No. 7
LONDON : 1968

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BY

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THE *ALOEIDES THYRA* COMPLEX (LEPIDOPTERA : LYCAENIDAE)

By G. E. TITE and C. G. C. DICKSON

SYNOPSIS

The complex which has hitherto been treated as *Aloeides thyra* (Linn.) is revised. Twelve new species and four new subspecies are described, and a key to the species is included.

INTRODUCTION

It has long been realized that the insects referred to as *Aloeides thyra*, which are to be found widely spread over the greater portion of southern Africa, do in fact include a complexity of closely related species and forms, differing widely in facies, but exhibiting only minor indeterminate characters in the male genitalia. The *A. thyra* group consists, with the exception of some examples of *simplex*, of species in which the median spots on the underside of the hind wing are conjoined, and form an irregular transverse fascia. In the species of *Aloeides* not under discussion, the median series consists of more or less separated spots. As absolute finality on the status and relationships of the various taxa cannot be attained at this stage, it is felt that recognizable taxa which are believed to be good species are best treated as species until their true affinities can be more decisively ascertained as further evidence becomes available. The late Mr. Gowan Clark made careful study of the early stages of some of the taxa, and has left us his precisely executed drawings (Plates 6–8); these drawings taken in conjunction with other data do suggest specific differentiation and indicate a line for further study. Trimen, in dealing with *thyra* (1866 : 273 and 1887 : 195), mentioned in some detail certain ‘ variations ’ which can now be assigned to taxa described in this work. It is fortunate that, as Trimen pointed out, the original description of *thyra* is sufficiently precise to place the name beyond doubt to the insect from the Cape Town area, having darkened veins on the upperside of the wings.

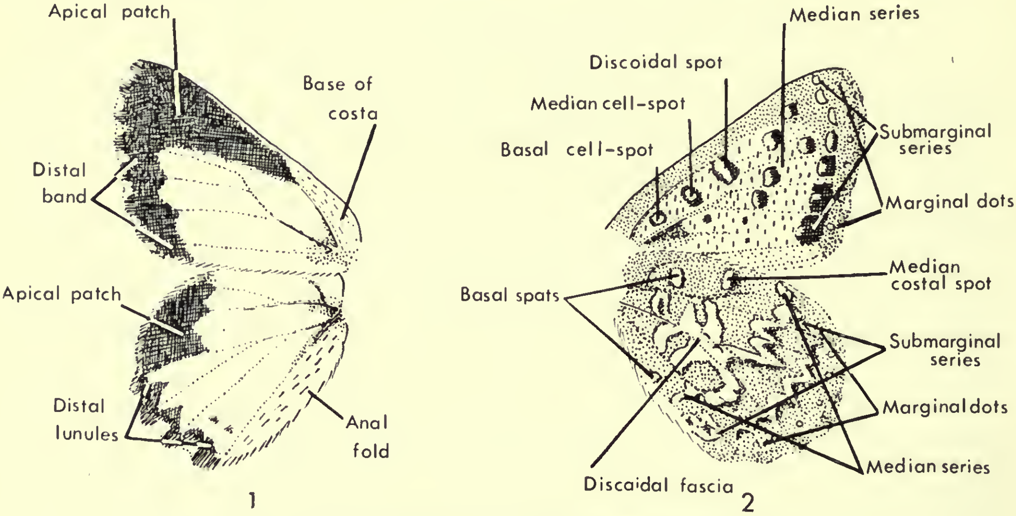
Evidence to support the specific separation of many of the taxa in the complex can be deduced from the fact that there is a considerable overlapping of their habitats, and that in many cases taxa do occur in the same area—sometimes even flying together—without any loss of identity. One thus concludes that interbreeding does not take place. Some instances of this are: *thyra* and *egerides* (Red Hill, Simonstown); *thyra* and *pallida grandis* (Du Toit's Kloof, and French Hoek); *thyra* and *lutescens* (Brand Vlei area); *thyra* and *vansoni vansoni* (Matjesfontein).

This paper is founded on the study of some 550 specimens in the collections of the Transvaal Museum, Pretoria, Mr. C. D. Quickelberge of East London, and the British Museum (Natural History). The word (Type!) after a reference indicates that the type has been examined and is in the collection of the B.M. (N.H.). In the case of citations of types, and detailed lists of paratypes, the present whereabouts of the specimens is indicated by the following abbreviations: (B.M.) =

British Museum (Natural History); (Tr.M.) = Transvaal Museum; (Q.) = Collection of Mr. Quickelberge; (Penn.) = that of Mr. Pennington.

Fore wing measurements are given for all species; they represent the distance between the base and apex of the wing. It should be remembered that these figures serve only as a guide to the approximate size of normal individuals, and do not in themselves constitute any definite means of identification.

The wing-pattern of all members of the complex is basically the same, only differing in a minor degree in the various taxa. Throughout this work, the names given to the wing characters in Text-figs. 1 and 2 are used, and to avoid repetition only significant characters are referred to in the descriptions. A general description of the taxa under consideration, in both sexes, can be summarized as follows.

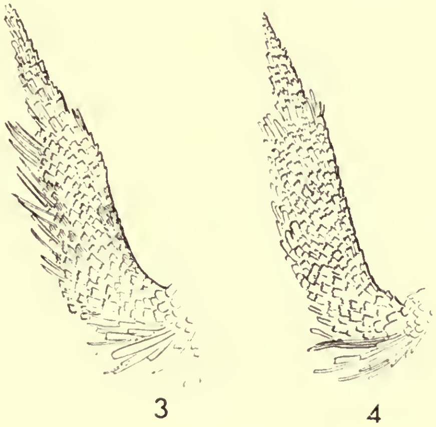

Apical patch
Base of costa
Distal band
Apical patch
Distal lunules
Anal fold
1
Median series
Discoidal spot
Median cell-spot
Basal cell-spot
Submarginal series
Marginal dots
Median costal spot
Basal spots
Submarginal series
Marginal dots
Median series
Discoidal fascia
2

FIGS. 1–2. The Wing Pattern in the *Aloeides thyra* Complex. (diagrammatic): 1, upperside; 2, underside.

Upperside. The fore wing is tawny orange, heavily margined by the black distal band and apical patch; the latter usually extending basad along the costa and fusing with an ochreous stripe arising from the base. Hind wing, tawny orange with a blackish apical patch, and a connected series of distal lunules in areas 1, 2, and 3; the anal fold is ochreous. In some taxa, the apical patch and distal band take the form of a continuous even and regular band, in which case they are referred to as the marginal bands.

Underside. Tawny orange on the fore wing, margined by a wide continuous costal and distal marginal band, varying individually in colour from pale fuscous, through various shades of brown and red-brown to crimson lake. There are three usually white-centred black spots in the cell, the basal, median and discoidal spots. The two last named are frequently double pupilled. Then follows a median series of up to seven black spots, usually bordered inwardly with white, the spot in area 4 being placed well distad, and that in 5 slightly basad. A submarginal series consists of similar spots that are graduated in size, those in areas 1 to 3 being very large, the remainder diminishing in size as they approach the apex, and often appearing wholly white. A series of interneural white dots before the margin is present in certain species. The hind wing is variably coloured as in the border of the fore wing, the markings, though sometimes obscure, being usually lighter than the ground, often greyish or silver, and sometimes edged with black. They consist of four or more basal spots, a round spot in the centre of area 7, an irregular discoidal fascia composed of conjoined spots and sometimes fused with the median series and one of the basal spots, a very irregular sinuate median series, a series of submarginal lunules, and a marginal series of white dots. The last named is not always present as in the fore wing.

Palpi. These organs are heavily covered with rather broad scales, mostly having 3 to 5 teeth along their distal margin, but those scales on the ventral portion of the second segment have a smooth distal margin. In certain species, longer ribbon-like scales occur, scattered among the normal ones, but mostly arising from a longitudinal area to the outward side of the ventral portion. This character is of value in the identification of species, but care must be observed in its use as in museum specimens a few cases do occur in which the long scales have apparently become detached or broken off.



FIGS. 3–4. Labial palpi: 3, *A. penningtoni;* 4, *A. natalensis.*

Early stages. The larvae of the group are always associated with ants, but being vegetable feeders, are not fully dependent upon them. In all known instances, the food-plant has proved to be a species of *Aspalathus* (Leguminosae).

ACKNOWLEDGEMENTS

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ALOEIDES Hübner

Aloeides Hübner, 1819 : 73.
Aloeides Hübner; Scudder, 1875 : 107.
Aloeides Hübner; Aurivillius in Seitz, 1924 : 424.

Aurivillius quoted this name for his second group of the genus *Phasis;* his statement that the palpi are without bristly hairs is not true in all cases, but in all other respects his diagnosis is correct. The type of the genus was fixed by Scudder as *pierus*, a species closely allied to *thyra*.

KEY TO THE SPECIES

1 Upperside all wings, veins darkened throughout their length by dusky scaling. Hind wing, costa in males and most females widely black ***thyra*** p. 373 (Pl. 1, figs. 5–10, 15–20)

– Upperside all wings, veins not darkened throughout their length by dusky scaling. Hind wing, costa in both sexes not widely black 2

2 Upperside all wings, veins not darkened or only partially so. Fore wings, distal band wide, more than 3 mm. at vein 3 ***pallida*** p. 374 (Pl. 1, figs. 11–14, 21–24, Pl. 2, figs. 25, 26, 28, 29, 35, 36, 38, 39)

– Upperside all wings, veins not darkened. Fore wings, distal band narrow, less than 3 mm. at vein 3 3

3 Fore wing broad, distal band usually narrow. Hind wing, apical patch never more than a slight thickening of the dark margin 4

– Fore wing narrow, distal band moderately wide. Hind wing, apical patch always obvious, often forming a quadrate or triangular patch 7

4 Fore wing, apex not acute. Hind wing underside: the median and submarginal series heavily margined distally with black, which contrasts with the deep crimson —in some individuals rich brown—ground colour, giving the wing a distinctive and decorative appearance 5

– Fore wing apex acute. Hind wing underside: the median and submarginal series not heavily margined with black, and the wing is of a less decorative appearance 6

5 Hind wing underside, varying from rich brown to deep crimson ***dentatis*** p. 376 (Pl. 2, figs. 31–34, 41–44)

– Hind wing underside, varying from pale brown to pink ***braueri*** p. 376 (Pl. 2, figs. 27, 30, 37, 40)

6 Upperside, dark margins usually narrow. Fore wing, apical patch does not (or does only vestigially) extend inwards along the costa ***simplex*** p. 377 (Pl. 3, figs. 45–47, 56–58)

– Upperside, dark margins wide. Fore wing, apical patch does extend inwards along the costa . . . . . . ***vansoni*** p. 378 (Pl. 3, figs. 48–51, 59–62)

7 Fringes on all wings unspotted, fuscous with a faint golden sheen in certain lights. Fore wings: dark margins of approximately even width, not expanded to form a triangular patch at the apex . . . ***dryas*** p. 379 (Pl. 5, figs. 91–92, 104–105)

– Fringes on all wings spotted. Fore wings: dark margins often of uneven width, always expanded to form a triangular patch at the apex 8

8 Palpi, in both sexes, with long ribbon-like scales present along their ventral surface. Hind wing underside: the median series irregular, with sharp projections distally 9

– Palpi, in both sexes, with ribbon-like scales absent, or if present quite short, projecting only slightly beyond the normal ones. 10

9 Fore wing upperside, the distal band noticeably decreases in width as it approaches the anal angle . . . . ***penningtoni*** p. 380 (Pl. 5, figs. 101–102, 114–115)

– Fore wing upperside, the distal band does not noticeably decrease in width as it approaches the anal angle . . ***natalensis*** p. 380 (Pl. 5, figs. 93–94, 106–107)

10 Palpi with short ribbon-like scales 11

– Palpi without any ribbon-like scales 12

11 All wings, margins wide (more than 3 mm. at vein 3 fw.) and intensely black ***quickelbergei*** p. 381 (Pl. 3, figs. 54–55, 65–66)

– All wings, margins narrow (approximately 2 mm. at vein 3 fw.) and dingy brown-black . . . . ***oreas*** p. 382 (Pl. 5, figs. 99, 103, 112, 116)

12 Hind wing underside, median series smoothly sinuate, never with sharp projections 13
– Hind wing underside, median series irregular, with sharp projections 16
13 Fore wing underside, submarginal series of black spots accompanied distally by a series of whitish lunules . . ***clarki*** p. 382 (Pl. 4, figs. 77, 78, 89, 90)
– Fore wing underside, submarginal series of black spots not accompanied distally by a series of whitish lunules 14
14 Hind wing underside, brown or red-brown ***depicta*** p. 383 (Pl. 3, figs. 52–53, 63–64, Pl. 5, figs. 100, 113)
– Hind wing underside, grey or very pale brown (straw colour) 15
15 Hind wing underside, some shade of grey often laved with yellow ***arida*** p. 384 (Pl. 4, figs. 71–73, 75–76, 83–85, 87–88, Pl. 5 figs 97–98, 110–111)
– Hind wing underside, pale brown, almost straw colour. ***lutescens*** p. 385 (Pl. 4, figs. 67–68, 79–80)
16 Hind wing underside, the median series below vein 5 and the basal spots (5 or 6 in number) are silver-white and very conspicuous ***egerides*** p. 385 (Pl. 5, figs. 95–96, 108–109)
– Hind wing underside, the median series partly obsolete and mainly represented by a broad fascia extending across the bases of areas 1 to 4, basal spots prominent but not more than 4 in number . . ***margaretae*** p. 386 (Pl. 4, figs. 70, 74, 82, 86)

Aloeides thyra (Linnaeus)

(Pl. 1, figs. 5–10, 15–20)

Papilio thyra Linn., 1764 : 329, Cape of Good Hope.
Papilio thyra Linn.; Linn., 1767 : 789, Cape of Good Hope.
Papilio nycetus Stoll (in Cramer), 1781 : 178, pl. 380, figs. F & G. Cape of Good Hope.
Papilio evadrus Fabricius, 1787 : 89, Cape of Good Hope.
Aloeides thyra (Linn.) Hübner, 1825 : pl. 88.
Phasis thyra (Linn.) Aurivillius (in Seitz) 1924 : pl. 70 g.

Length of fore wings: ♂ 12–16 mm.; ♀ 13·5–18 mm.

Some amplification of the characters mentioned in the key is desirable. In both sexes, the dark scaling on the wing veins is indeed variable, examples occurring in which the scaling is so extensive that it spreads outwards from the veins over the tawny orange ground, and in one example is so predominant that the tawny orange ground is only present in area 1 and as a small fragment in area 2. Other examples exist in which the vein scaling (though present) is so narrowly restricted that it is not easily apparent. On the hind wing, the apical patch is widely black, covering much of the cell, area 5, and in all but a few examples (females), extending along the costa to the base. Underside, the ground colour varies individually from pale brown, through brown, red-brown to deep pink, and red; the markings on the hind wing are usually quite prominent, and of a whitish grey or leaden colour. The white marginal dots are not present.

The short series from Matjesfontein (3 ♂, 6 ♀) may possibly represent a local form or minor race. The fore wings are rather more pointed, the veins only scantily darkened, and with one exception the fore wings exhibit a clear white centre to the discoidal spot on the upper surface. Without further evidence it is not deemed desirable to name this form.

Flying from September (occasionally August) to April, the species is to be found in the Cape Peninsula, and in the more westerly parts of Cape Province. It occupies a wide variety of habitats, and is to be found close to the sea as well as on hills and mountains, being somewhat localized in its occurrence. Specimens examined are from: Cape Town; Muizenberg Mt.; Wynberg Hill; Newlands; Lion's Head; Table Mountain; Blinkwater Ravine; Simon's Town; Strandfontein, False Bay; Cape Point; Mamre; Llandudno; Clanwilliam; De Wet; Gydo Mt.; Saldanha Bay; Milnerton; Retreat; Stellenbosch; Matjesfontein.

Aloeides pallida (Riley) **stat. n.**

The separation of this species is justified by the fact that the subspecies *pallida grandis* inhabits some part of the territory of *thyra;* it occurs at high or fairly high altitudes, in some cases in actual contact with it, but has a much shorter emergence period, only appearing on the wing during the months of October, November and December. A single example was once taken in mid-January. Mr. Pennington holds the opinion that the species forms a cline, developing progressively eastwards away from the winter rainfall area of the Cape. With every respect to Mr. Pennington, the series under examination, though individually variable, can be divided into three subspecies to the satisfaction of both authors, and this course is therefore adopted. Long ribbon-like scales are present on the palpi, they do not project far beyond the normal scales. The white marginal dots on the underside of the hind wing are normally present.

A. pallida pallida (Riley) **stat. n.**

(Pl. 2, figs. 28–29, 38–39 Pl. 7 figs. 14–17)

Phasis thyra f. *pallida* Riley, 1938 : 283, pl. 1, fig. 9, pl. 2, fig. 34, Steyneberg [*sic*] recte Steynsburg. (Type!)
Aloeides thyra f. *pallida* (Riley) Peters, 1952 : 110.

Length of fore wing: ♂ 15–19 mm.; ♀ 17–22 mm.

Readily identifiable by its large size and pallid aspect in both sexes. The upperside is of a decidedly paler tawny orange than is that of *thyra;* the dark margins are very variable in both shape and width, especially on the hind wing, where the apical patch is large, and in most examples extends as far as vein 4, in others reaching vein 5; whereas in the type it merges gradually into the discal lunules without definite demarcation. On the under side, all wings exhibit a pale, rather washed out appearance. The three spots of the submarginal series in areas 1, 2 and 3 of the fore wing are clearly defined, and not surrounded by an area of dusky scaling.

This race occurs mainly in the eastern parts of Cape Province and in the Orange Free State; the series studied are from: CAPE PROVINCE: Steynsburg; Annshaw (probably in the Albany district); Grahamstown; Port Elizabeth; Uitenhage; Witteklip; Mossel Bay; Naauwpoort; Willowmore; Matjesfontein; Bergerville Road; 10 ♂, 17 ♀. ORANGE FREE STATE: Reddersburg, 1 ♂, 1 ♀.

Aloeides pallida grandis ssp. n.

(Pl. 1, figs. 11–14, 21–24)

Length of fore wing: ♂ 16–19 mm.; ♀ 20–23 mm.

♂ ♀ Upperside. The tawny orange areas are deeper in colour than are those of the nominate race, the margins being wide and intensely black. The apical patch on the fore wing extends inward along the costa to about two-thirds of its length. On the hind wing the apical patch is large, and often extends below vein 4. Some individuals exhibit a definite black discoidal spot. Underside. In the types, the marginal area of the fore wing is of a medium olive-brown, but this colour varies greatly through the series, some examples occurring in which these areas are a beautiful deep red. On the fore wing, the three spots of the submarginal series in areas 1, 2, and 3 are surrounded by a roughly triangular clouding of dusky scales.

This, the largest and most striking member of the complex occurs in restricted localities in the mountain ranges in the south-west of Cape Province.

Holotype ♂. CAPE PROVINCE: Du Toit's Kloof, 23.xi.1965 (*C. G. C. Dickson*), B.M. Type No. Rh. 18556.

Allotype ♀. As holotype, B.M. Type No. Rh. 18557.

Paratypes. CAPE PROVINCE: as holotype, 1 ♂, 2 ♀ (B.M.); French Hoek Pass, xi.1950 (*A. J. Duke*), 1 ♂ (B.M.); French Hoek Mountains, 19.xi.1949 (*A. J. Duke*), 1 ♂, 2 ♀ (Tr.M.); Garcia Forestry, xi.1940, and '41 (*G. van Son*), 3 ♂, 1 ♀ (Tr.M.); Garcia's Pass, xi.1946 (ex T. H. E. Jackson coll.), 1 ♂ (B.M.); Garcia Pass, 1,800 ft., 28.xi.1938 (*R. C. Wood*), 1 ♀ (B.M.); Top of Bain's Kloof, 25.x.1941 (*G. van Son*), 1 ♂, 2 ♀ (Tr.M.); Grootvadersbos, 1–8.xi.1940 (*G. van Son*), 2 ♂, 3 ♀ (Tr.M.); Jonkersberg, xi.1940 (*G. van Son*), 1 ♀ (Tr.M.).

A. pallida littoralis ssp. n.

(Pl. 2, figs. 25–26, 35–36)

Zeritis thyra (Linn.), Hewitson, 1852 : pl. 76, fig. 9.
Zeritis thyra (Linn.), Trimen, 1887 : pl. 9, fig. 5.

Length of fore wing; ♂ 14–17 mm.- ♀ 20–23 mm.

♂ ♀. Similar to *P. grandis*, but differs in the following characters: on the upperside of the fore wing, the inner edge of the distal band is distinctly concave in between the veins in interspaces 1, 2, and 3; the veins are usually rather more heavily scaled. On the hind wing the apical patch extends further towards the base, closely approaching the discoidal spot, which is present in all the specimens examined.

The underside is like that of *P. grandis*.

Closely affined to *P. grandis*, and as far as is known represents the species in the southwest Cape Coastal area at presumably lower altitudes.

Holotype ♂. CAPE PROVINCE: Knysna (ex Trimen), B.M. Type No. Rh. 18558.

Allotype ♀. CAPE PROVINCE: Knysna, 21.xii.1965 (*N. A. Brauer*), B.M. Type No. Rh. 18559.

Paratypes. CAPE PROVINCE: Sour Flats, Knysna, 22–24.xi.1954 (*L. Vari*), 1 ♂, 2 ♀ (Tr.M.); Knysna, 5.xi.1965 (*C. D. Quickelberge*), 1 ♂, 1 ♀ (Q.); Knysna, 18.xi. 1932, 1 ♂ (Tr.M.); Knysna (ex Trimen), 2 ♂, 1 ♀ (B.M.); Knysna (ex Felder), 1 ♂, 2 ♀ (B.M.); Still Bay, 9–12.xi.1940 (*G. van Son*), 1 ♂ (Tr.M.).

Aloeides dentatis (Swierstra)

A. dentatis dentatis (Swierstra) **stat. n.**

(Pl. 2, figs. 31–32, 41–42)

Phasis dentatis Swierstra, 1909 : 177, Waterval Onder, Transvaal.
Phasis thyra dentatis Swierstra; Riley, 1938 : 239.

Length of fore wing: ♂ 13–14 mm.; ♀ 14–16·5 mm.

The distinctive pattern on the underside of the hind wing renders this species easily identifiable; the black-edged, whitish grey markings stand out sharply on the brown to deep crimson ground, giving the wing a most decorative appearance. The discoidal fascia tends to be broken up into separate spots. On all wings, the marginal dots are present. The palpi are without ribbon-like scales.

In a letter, Mr. Henning states that the Witpoortjie colony is restricted to a small area—about the size of a football ground—situated in flat country, and quite away from the neighbouring ridges on which other *Aloeides* species occur; they are on the wing from October to April, flying up to 5 p.m. He is of the opinion that the earlier specimens (October to January) have brighter, more reddish undersides than the later examples, and that individuals with a really brown underside are comparatively rare.

Examples studied from TRANSVAAL: Johannesburg; Witpoortjie; Pretoria; 15 ♂, 10 ♀.

A. dentatis maseruna (Riley) **comb. n.**

(Pl. 2, figs. 33–34, 43–44)

Phasis thyra maseruna Riley, 1938 : 239, pl. 1, figs. 11–12, pl. 2, figs. 36–37, Maseru, Basutoland (Type!)

Very similar to the nominate subspecies in both sexes, only differing in the less intense black of the margins on the upperside, and the somewhat wider median and submarginal series on the hind wing underside.

Examples studied. LESOTHO: Maseru, 2 ♂, 4 ♀.

Aloeides braueri **sp. n.**

(Pl. 2, figs. 27, 30, 37, 40)

Length of fore wings: ♂ 15–16 mm.; ♀ 17–18 mm.

♂ Upperside. On all wings, the colour is clear tawny orange, of a lighter shade than that of *thyra*. The distal band on the fore wings is of even width, 2·5 mm. approximately. The apical patch is even narrower, barely extending below vein 6, and decreasing in width progressively as it approaches the buff area at the base of the costa. On the hind wing, the apical patch is reduced to a mere thickening of the distal band. The cilia on all wings are heavily checkered with white between the veins.

♂ Underside. The marginal dots are absent on all wings. On the fore wing, the spots of the median series are small, those in areas 2, and 3 especially so, and the double spot in area 1 vestigial or altogether missing. On the hind wing the colour varies individually from light dun-brown to a rather dull shade of sullied pink; the median and submarginal series are dull grey, of a tint that contrasts only feebly with the ground, and only the blackish distal edging of these markings renders them easily visible.

♀. Only differs from the male in the very slightly paler shade of tawny orange on the upperside.

The palpi are without ribbon-like scales.

Holotype ♂. CAPE PROVINCE: Bulhoek, Queenstown, 13.x.1962 (*N. A. Brauer*), B.M. Type No. Rh. 18560.

Allotype ♀. CAPE PROVINCE: Queenstown, xi.1960 (*N. A. Brauer*), B.M. Type No. Rh. 18561.

Paratypes. CAPE PROVINCE: as holotype, 2♂; Cathcart, 1961–63 (*C. D. Quickelberge*), 2 ♂, 1 ♀ (Q.). BASUTOLAND: Nsututse Pass, 8,000 ft., 2.i.1947 (*C. Jacot-Guillarmod*), 1 ♀ (Tr.M.).

Aloeides simplex (Trimen)

(Pl. 3, figs. 45–47, 56–58)

Zeritis simplex Trimen, 1893 : 136, Damaraland; Port Nolloth; Khama's Country to Mashunaland (Syntypes!)
Aloeides simplex (Trimen) Peters, 1952 : 109.

Length of fore wing: ♂ 13–17 mm.; ♀ 14–19mm.

The palpi are without ribbon-like scales; their ultimate segment is individually variable in length. Marginal dots are never present on the underside of all wings.

The insects herein referred to this species show considerable variation, and come from a wide area stretching from the coasts of Little Namaqualand and South West Africa to Botswanaland. Study of the exterior characters and the genitalia of both sexes has failed to reveal any evidence that more than one species is involved, or that any subspecies can be defined. Trimen described *simplex* from four examples, labelling all four ' type '. These specimens are now in the B.M. (N.H.) and do, as Trimen suggested, exhibit considerable differences. They are in fact syntypes, and in order to avoid possible confusion in the future, we hereby select the male labelled ' Damaraland, C. J. A.' as the LECTOTYPE in accordance with the International Code of Zoological Nomenclature, para. 74(a). The two examples labelled 'Durban, 1889, Millar ' (mentioned by Trimen) are in the B.M.; they are in fact referable to *A. penningtoni*.

A short series of both sexes from Kuruman agrees well with the lectotype; they are all of large size, tawny orange above with extremely narrow dark borders, and the ground colour of the hind wing underside is of a ferruginous sandy tint. In contrast, a series from Aus and Namtib in South West Africa, though variable in size, do tend to be smaller; their dark borders are wider, in one female attaining a width of 3 mm. in area 3 of the fore wing. The underside of the hind wing is dusky brown. Specimens from Hondeklip Bay and Springbok are similar but their hind wing undersides are more greyish. The Trimen specimens from Port Nolloth and Khama's Country to Mashunaland are also of this form. Dr. van Son states that the large sandy form does occur together with the small one at Aus, and suggests that there is a slight possibility that two species are involved; he thinks it unlikely that they are seasonal or geographical forms.

Examples studied. BECHUANALAND: Kuruman; Niekerkshope. BOTSWANALAND: Khama's Country to Bechuanaland; N'kate, Marikari. NAMAQUALAND: Port Nolloth; Hondeklip Bay; Springbok; Soebatsfontein. SOUTH WEST AFRICA: Aus: Namtib; Damaraland; 24 ♂, 26 ♀.

Aloeides vansoni **sp. n.**

A. vansoni vansoni **ssp. n.**

(Pl. 3, figs. 49, 50, 60, 61)

Length of fore wing: ♂ 14–18 mm.; ♀ 15–19·5 mm.

♂ Upperside. The ground colour is tawny orange with a deeper, more reddish tinge than that of *simplex*. The margins are narrow, but variable in width, usually being wider than those of that species. On the fore wing, the apical patch is larger, and extends over half the length of the costa. On the hind wing a slight swelling of the narrow distal margin is all that remains of the apical patch, which never forms a quadrate spot as in *thyra*.

Underside. Dingy fuscous on the hind wing and margins of the fore wing. The hind wing pattern complete, but only appearing vaguely in shades of grey, very much as in *simplex* from Aus. On the fore wing, the fuscous apical portion extends inwards as far as the two spots of the median series situated in areas 4 and 5. In shape, the fore wing is remarkably pointed at the apex; this character—although individually variable—is sufficiently noticeable in all specimens to distinguish them from all other species in the complex.

♀. Like the male on both surfaces, except that on the underside fore wing the fuscous area at the apex does not in every case extend as far as the median spots in areas 4 and 5. The wings are broader and not noticeably more pointed than those of the same sex in other species of the complex.

♂ ♀. The labial palpi are without ribbon-like scales.

Holotype ♂. CAPE PROVINCE: Matjesfontein, 22–26.ix.1940 (*G. van Son*), (Tr.M.).

Allotype ♀. As holotype, 18.x.1954 (Tr.M.).

Paratypes. CAPE PROVINCE: as holotype, 1 ♂ (B.M.); as holotype, 20.x.1941, 1 ♀ (B.M.); as allotype, 2 ♂, 2 ♀ (Tr.M.); Bergerville Road, 11.x.1939 (*G. C. Clark*), 2 ♂, 3 ♀ (Tr.M.); Prince Albert Road, 19.x.1941 (*G. van Son*), 3 ♀ (Tr.M.); Nieuwveld Mtns., near Beaufort West, 4.x.1954 (*C. G. Dickson*), 1 ♂, 1 ♀ (B.M.); 10 miles S. of Beaufort West, 19.x.1941 (*G. van Son*), 1 ♀ (Tr.M.); Deelfontein, 16.ix.1902 (*Col. Sloggett*), 1 ♂ (B.M.).

A. vansoni juana ssp. n.

(Pl. 3, figs. 48, 51, 59, 62)

Length of fore wing: ♂ 16·5–18 mm.; ♀ 18 mm.

♂ Upperside. Only differs from that of the nominate race by the deeper and even more reddish tinge of the tawny ground, and by the wider and more intensely black margins. The underside is slightly darker, but is otherwise similar. In one example, all the fuscous areas are replaced by deep dusky pink.

Whereas the nominate subspecies inhabits the Karroo region, this montane race extends along the Swartberg range and is the southern representative of that species.

Holotype ♂. Cape Province: Hills 3½ miles S. of Ladismith, 1.ix.1965 (*C. G. Dickson*), B.M. Type No. Rh. 18562.

Allotype ♀. Cape Province: Willowmore, 15.x.1917 (*Dr. Brauns*), B.M. Type No. Rh. 18563.

Paratypes. Cape Province: as holotype, 2 ♂ (B.M.); Seven Weeks Poort, 21.x.1954 (*G. van Son*), 2 ♂ (Tr.M.); West of Calitzdorp (Hill summits, Huis R. Pass), 2.ix.1965 (*C. G. Dickson*), 1 ♂ (B.M.); Uniondale, 14.iii.1940 (*G. van Son*), 1 ♀ (Tr.M.).

Aloeides dryas sp. n.

(Pl. 5, figs. 91, 92, 104, 105)

Length of fore wing: ♂ 15–18 mm.; ♀ 14–19 mm.

♂ Upperside. Deep tawny orange, the dark margins are narrow (approximately 2 mm. in area 3), and the apical patch takes the form of a stripe along the outer two-thirds of the costa; it is not noticeably widened at its junction with the distal band. On the hind wing, the distal lunules form a continuous narrow sinuate band, and the apical patch is irregular in shape, but never quadrate. ♀. As in the male.

♂ ♀ Underside. The fore wing margins and the hind wing are individually variable shades of red-brown. On the fore wing the distal margin is very narrow; so much so, that the spots of the submarginal series in areas 1, 2, 3, and 4 are placed well within the tawny orange portion, and quite clear of the marginal band. The median series is prominent, and in some examples includes two extra spots in area 1. On the hind wing, the markings are metallic, and are only faintly margined with black. The marginal dots on all wings are not evident.

The plain fringes, the characteristic restriction of the fore wing apical patch, and the presence of long ribbon-like scales, extending well beyond the tips of the normal scales, on the second segment of the labial palpi, serve easily to identify this species.

Dr. van Son (i. l.) says: ' This is undoubtedly a distinct species. It is confined to areas very close to the rain forests, or even within clearings in the rain forest, as in Malta, or above the Hanglip, Zoutpansberg. Lower Umfolosi River (Zululand) would seem a bit low, but it is a very moist area, so perhaps the labelling is correct.'

Holotype ♂. Transvaal: Zoutpansberg, Shilouvane, 1906 (*H. A. Junod*), B.M. Type No. Rh. 18564.

Allotype ♀. As holotype, B.M. Type No. Rh. 18565.

Paratypes. TRANSVAAL: Mountain Inn, Zoutpansberg, iii.1941 (*G. & E. van Son*), 1 ♂ (Tr.M.); White Heather Mine, 14.ii.1938 (*G. van Son*), 1 ♂, 1 ♀ (Tr.M.); Malta, Pietersburg, 2.ii.1927 (*G. van Son*), 1 ♂ (Tr.M.); Above Hanglip Forest, L. Trichardt, 24.iv.1956 (*G. van Son*), 1 ♂ (Tr.M.); as holotype, 5 ♂, 1 ♀ (B.M.); Sheba Mine, Barberton, 11.x.1949 (*G. van Son*), 1 ♀ (Tr.M.). L. Trichard [*sic*], 1–15.i.1920 (*H. G. Breyer*), 1 ♀ (Tr.M.).; ZULULAND: Lower Umfolosi River, 1922 (*H. H. Curson*), 1 ♀ (B.M.).

Aloeides penningtoni sp. n.

(Pl. 5, figs. 101, 102, 114, 115)

Length of fore wing: ♂ 13–18mm.; ♀ 14–17 mm.

♂ Upperside differs from *dryas* by the distinctly triangular apical patch on the fore wing, and by its conspicuously checkered fringes. The fore wing distal band is variable; in many examples, its inner edge is convexly scalloped between the veins, whereas in others, this edge is almost straight; in all, the band decreases in width as it approaches the anal angle. On the hind wing, the apical patch is not quadrangular, but is quite extensive, covering half the length of the costa.

♀ Upperside like that of the male, but the dark margins are wider. The inner edge of the fore wing distal band is not noticeably scalloped in any of the specimens examined.

♂ ♀ Underside. The marginal dots on all wings are usually evident. The ground colour varies from warm brown to deep rich red colour, the hind wing markings being easily discernible, and leaden silver in colour.

Palpi, on the second segment, always with long ribbon-like scales projecting far beyond the normal ones, and always longer and more numerous than those of the somewhat similar *oreas*.

From the material available, the species appears to be widespread in Natal, and rare in the eastern parts of Cape Province; much more material (with full data) is needed before a complete account of its distribution can be compiled.

Holotype ♂. NATAL: Gillitts, Durban 1.xii.1921 (*Dr. L. G. Higgins*), B.M. Type No. Rh. 18566.

Allotype ♀. NATAL: without further details, B.M. Type No. Rh. 18567.

Paratypes. NATAL: Durban (Trimen Coll.) 3 ♂, 1 ♀ (B.M.); Port Natal (Felder Coll.), 1 ♂ (B.M.); Umkomaas, 19.i.1913, 1 ♂ (B.M.); Kastrolnek (*G. v. Dam*), 1 ♂, 2 ♀ (Tr.M.), 1 ♂ (B.M.); Estcourt, 26.x.1890, 1 ♂ (B.M.); Enselini, Zululand, 1 ♂ (B.M.). CAPE PROVINCE: Transkei (*Miss Barrett*), 2 ♂ (B.M.); Glenconnor, 9.viii.1936 (*G. C. Clark*), 1 ♂ (B.M.); Grahamstown, xii.1901, 1 ♂ (B.M.); Franklin, East Griqualand, 3.i.1938 (*K. M. Pennington*), 1 ♂ (Penn.).

Aloeides natalensis sp. n.

(Pl. 5, figs. 93, 94, 106, 107)

Length of fore wing: ♂ 13–16 mm.; ♀ 14–16·5 mm.

♂ Upperside deeper tawny orange than in *penningtoni*, the dark margins are wider, and on the fore wing the distal band does not decrease in width towards the anal angle. The hind wing apical patch is more extensive, and in many examples, extends over more than half the length of the costa.

♀ similar to that of *penningtoni*, but the dark margins are wider.

♂ ♀ Underside as in *penningtoni*.

It is with some hesitation that this insect is described as a species; its many similarities to *penningtoni* might well suggest that it is a form of that species. In view however of the facts that the males at least are readily separable, and that the two do occur together in some areas, it is felt that the present treatment is most likely to call attention to the problem, and that others may be able to ascertain the truth of the matter.

Neither this nor the preceding species occurs in Durban itself today—or apparently in its immediate vicinity; *natalensis* has been taken in the Botha's Hill area in recent years.

Holotype ♂. NATAL: Muden, 9.xi.1949 (*H. Cookson*), B.M. Type No. Rh. 18568.

Allotype ♀. NATAL: Durban (ex Trimen coll.), B.M. Type No. Rh. 18569.

Paratypes. NATAL: Muden, i.1947–48 (*H. Cookson*), 5 ♂ (B.M.); Rosetta, 26.xi.1940 (*G. C. Clark*), 1 ♂ (Tr.M.); Balgowan, 6.xii.1947 (*K. M. Pennington*), 1 ♂ (Penn.); Yellowwoods, 27.xii.1965 (*K. M. Pennington*), 1 ♂ (Penn.); Durban, iv.1908 (*Miss M. Fountaine*), 1 ♂ (B.M.); Dargle, iv.1930 (ex T. H. E. Jackson coll.), 1 ♂ (B.M.); Newcastle, 27.viii.1893, 1 ♂ (B.M.); Karkloof, 1 ♂, 1 ♀ (B.M.); Ulundi, 12.ix.1896, 1 ♂ (B.M.); near Maritzburg, 2 ♂ (B.M.); Pinetown, 1 ♂ (B.M.); Vryheid (ex Trimen) 1 ♂, 1 ♀ (B.M.).

Aloeides quickelbergei sp. n.

(Pl. 3, figs. 54, 55, 65, 66)

Length of fore wing: ♂ 12·5–16 mm.; ♀ 16 mm.

♂ Upperside, deep tawny orange with heavy sooty black borders, the latter are even darker than those of *pallida grandis*. On the fore wing, the distal band is wider in area 1 than it is in areas 2 and 3, often attaining a width of 3·5 mm. The apical patch is large and triangular, and extends to the base of the costa, being brightened there by an admixture of tawny scales; its lower edge is almost straight, and runs from the base through the lower part of the cell, along the line of vein 4 (either touching or almost touching that vein) to the distal margin. On the hind wing, the apical patch is large and roughly quadrangular; it is cut squarely off at about a third the length of the costa, its lower edge being sharply terminated half-way between veins 4 and 5. The fringes are unicoloured grey-black in many examples, others exhibit a faint white checkering between the veins; often the individual checkering is represented by just one or two white cilia.

Underside, the ground colour is dingy brown, or in some examples dingy red-brown. On the hind wing, the discoidal fascia and median series are greyish, edged with black, but rather obscure; the submarginal series is scarcely evident, and the marginal dots are absent. The palpi contain a few short ribbon-like scales.

The dark margins, generally darker appearance, and average larger size serve to distinguish this from the somewhat similar *A. depicta;* its rather limited range suggests that it may prove to be a race of that species, replacing it at higher altitudes in the more southern parts of Cape Province. No indication of altitude is given on the data labels, but Mr. Quickelberge states that it flies at 3–4,000 ft.

Holotype ♂. CAPE PROVINCE: Robinson Pass, 30.xii.1965 (*N. A. Brauer*), B.M. Type No. Rh. 18570.

Allotype ♀. As holotype, B.M. Type No. Rh. 18571.

Paratypes. CAPE PROVINCE: as holotype, 1 ♂ (B.M.); Outeniqua Pass, 23.xii. 1963 (*C. D. Quickelberge*), 2 ♂, (Q.); Garcia Forestry, 16.ix.1941 (*G. van Son*), 1 ♂ (Tr.M.); Grootvadersbos, 1–6.xi.1940 (*G. van Son*), 2 ♂ (Tr.M.); Jonkersberg, xi. 1940 (*G. van Son*), 3 ♂, 1 ♀ (Tr.M.); N.E. of Knysna, 24.xi.1965 (*Mrs. K. M. Wykeham*), 1 ♂ (B.M.); Still Bay, 8–12.xi.1940 (*G. van Son*), 1 ♂ (Tr.M.); Montagu Pass, 19.xii.1963 (*C. D. Quickelberge*), 1 ♂, 1 ♀ (Q).

Aloeides oreas **sp. n.**

(Pl. 5, figs. 99, 103, 112, 116)

Length of fore wing: ♂ 13–14 mm.; ♀ 14–15 mm.

♂ Upperside, the fore wings are shorter in proportion than those of *penningtoni* and *natalensis*, the dark margins being like those of the latter species. The apical patch on the hind wing contrasts with both by being cut off squarely at approximately one third the length of the costa. The fringes are but feebly checkered with white.

Underside, the colour of the hind wing is red-brown, the markings grey outlined with blackish, and only moderately distinct. The most definite distinguishing feature is the conformation of the median series, which takes the form of a serpentine band, its outer edge smoothly rounded, in distinct contrast to its really jagged counterpart in the species mentioned above. All wings are entirely without marginal white dots.

♀. Apart from the longer wings, this sex is similar to the male.

The palpi in both sexes possess only a few, not very obvious ribbon-like scales that hardly protrude above the normal ones.

Holotype ♂. NATAL: Loteni, 7,500 ft, 29.xi.1945 (*K. M. Pennington*), B.M. Type No. Rh. 18572.

Allotype ♀. NATAL: Giant's Castle, 8.x.1933 (*K. M. Pennington*), B.M. Type No. Rh. 18573.

Paratypes. NATAL: Giant's Castle, 4.x.1934 (*K. M. Pennington*), 1 ♂ (B.M.); Giant's Castle, x.1933 (ex T. H. E. Jackson coll.), 1 ♀ (B.M.); Niginya, Ulundi, 6,000 ft., ix.1896 (*G. A. K. Marshall*), 3 ♂ (B.M.); Ulundi, 14.ix.1896 (ex Adams coll.), 1 ♂ (B.M.). CAPE PROVINCE: Steynsburg, x.1933 (ex T. H. E. Jackson coll.), 2 ♂ (B.M.); Mt. Kubusie, Stutterheim, 7.x.1962 (*C. D. Quickelberge*), 3 ♂, 1 ♀ (Q.); Dohne Peak, Stutterheim, 15.x.1963 (*C. D. Quickelberge*), 1 ♀ (Q.); Outeniqua Mts., xi.1936 (*R. C. Wood*), 1 ♂ (B.M.); Hankey, v.1939 (ex T. H. E. Jackson coll.), 1 ♂ (B.M.).

Aloeides clarki **sp. n.**

(Pl. 4, figs. 77, 78, 89, 90; Pl. 7, figs. 1–13)

Length of fore wing: ♂ 13 mm.; ♀ 13·5 mm.

♂ Upperside, slightly smaller, but otherwise very similar to that surface in *oreas*.

Underside fore wing, the distal margin is grey-brown; the submarginal series consists of six black spots, the two nearest the apex being each accompanied inwardly by a white spot; then follows distally a series of six white spots, which are followed in turn by a marginal series of black spots, containing near their distal edges the white marginal dots. All this, together with the strongly black and white checkered fringe gives a neat and pleasing pattern, more precise than any to be seen in *oreas* or other allied species. On the grey-brown hind wing, the whitish grey, black-edged markings are also comparatively precise; the four basal spots are distinct and rounded; the discoidal fascia is broken up into separate spots, a rounded one in the centre of the cell, an elongate spot or bar at the cell-end, a rounded spot in area 1, and an irregular smear in the anal fold. The median series is sinuate and continuous, it does not coalesce with the discoidal fascia. The submarginal series consists of blackish lunules, for the most part surrounded vaguely by whitish grey; these lunules enclose obscure brownish spots, with vague black centres, the latter being closely accompanied by the marginal white dots.

The late Mr. Gowan Clark expressed a wish that this insect should bear the above name as a tribute to his son Mr. Douglas G. Clark, who captured the first specimen in the type locality during Easter, 1963, which gave clear evidence of the butterfly's distinctive nature.

Holotype ♂. Cape Province: Aloes-Coega Flats, 11.iv.1963 (*G. C. Clark*), B.M. Type No. Rh. 18574.

Allotype ♀. As holotype, 18.iv.1963, B.M. Type No. Rh. 18575.

Paratypes. Cape Province: as allotype, 1 ♀ (B.M.), Coega, 10.iv.1938 (*G. C. Clark*), 1 ♀ (Tr.M.).

Aloeides depicta **sp. n.**

A. depicta depicta **ssp. n.**

(Pl. 3, figs. 52, 53, 63, 64; Pl. 8, figs. 1–24)

Length of fore wing: ♂ 14–17 mm.; ♀ 14–17 mm.

♂ Upperside, similar to that of *oreas*, but the insect is on the average larger, and the fringes are more distinctly checkered. The fore wing is more pointed, and the anal angle of the hind wing is produced to a blunt point, the distal margin between it and vein 4 being in most examples slightly concave.

Underside, similar to that of *oreas*, but the hind wing in the majority of specimens is dull brown, without any trace of red. The markings are rather less regular, not quite so smoothly sinuate as in *oreas*, but never really jagged as in *penningtoni*.

♀. The wings are broader, the hind wing anal angle not produced, but in other respects like the male.

Palpi never with ribbon-like scales.

Holotype ♂. Cape Province: Uitvlugt, B.M. Type No. Rh. 18576.

Allotype ♀. Cape Province: Uitvlugt, B.M. Type No. Rh. 18577.

Paratypes. Cape Province: Matjesfontein, ix.x.1940–41 (*G. van Son*), 1 ♂, 1 ♀ (Tr.M.); Matjesfontein, 25–30.x.1928 (*R. E. Turner*), 1 ♂ (B.M.); Prince Albert Road, ix.x.1941 (*G. van Son*), 2 ♀ (Tr.M.); Swartberg Pass, 9.x.1965 (*C. D. Quickelberge*), 1 ♂ (Q); Seven Weeks Poort, x–xi.1941 (*G. van Son*), 2 ♂, 1 ♀ (Tr.M.); Knysna, 18.xi.1932 (*G. C. Clark*), 1 ♂, 1 ♀ (Tr.M.); Knysna, 1 ♂, 1 ♀ (B.M.); Port Elizabeth, 28.x.1932 (*G. C. Clark*), 1 ♂, 3 ♀ (Tr.M.); Eagles Crag, N.E. of Port Elizabeth, 15.xi.1934 (*G. C. Clark*), 1 ♂, 2 ♀ (B.M.); Coega, 15.x.1939 (*G. C. Clark*), 1 ♀ (Tr.M.); Groendal, nr. Uitenhage, 15.x.1950 (*A. J. Duke*), 1 ♂ (B.M.); Uniondale, 14.iii.1940 (*G. van Son*), 1 ♀ (TrM.); Cradock, x.1960 (*G. C. Clark*), 1 ♂ (B.M.); Naude's Pass, 22.iii.1940 (*G. van Son*), 2 ♂, 2 ♀ (Tr.M.); Burghersdorp, xi.1947 (ex T. H. E. Jackson coll.), 1 ♂ (B.M.); Glenconnor, 9.ix.1936, 1 ♂ (B.M.); Camdeboo Mts, above Palmietfontein, 16.iii.1965 (*C. G. Dickson*), 1 ♂, 1 ♀ (B.M.); Uitvlugt, 3 ♂, 2 ♀ (B.M.).

A. depicta apicalis **ssp. n.**

(Pl. 5, figs. 100, 113)

Length of fore wing: ♂ 16–17 mm.; ♀ 17·5 mm.

♂. Differs from the nominate race in that the fore wing apex is decidedly more pointed; the distal margin is slightly concave; the hind wing distal margin below vein 4 is usually markedly concave, and the anal angle even more produced. On the upperside the margins are very broad—quite as broad—but not so intensely black as those of *quickelbergi*. On the underside, the colour is sandy brown, considerably paler in tone than in any example of the nominate subspecies.

This appears to be restricted to Little Namaqualand and the adjacent more western parts of Cape Province.

Holotype ♂. CAPE PROVINCE: O'okiep, Little Namaqualand (Trimen Coll.), B.M. Type No. Rh. 18578.

Paratypes. CAPE PROVINCE: Kamiesberg, 5.i.1967 (*K. M. Pennington*), 1 ♂ (Penn.); Top of Eland's Kloof, Citrusdal, 2.x.1940 (*G. van Son*), 2 ♂ (Tr.M.); Clanwilliam, x.1950, 1 ♂ (B.M.); Farm Swartberg, Piquetberg Road, 8.xi.1948 (*G. van Son*), 1 ♂, 1 ♀ (Tr.M.).

Aloeides arida **sp. n.**

(Pl. 4, figs. 71–73, 75, 76, 83–85, 87, 88; Pl. 5, figs. 97, 98, 110, 111)

Length of fore wing: ♂ 13–16 mm.; ♀ 15·5–18 mm.

♂. The fore wing apex is pointed, but less so than that of *apicalis*; the distal margin is convex. On the upperside, the dark marginal bands are as in *apicalis*, but rather narrower, and of a less intense black. The fore wing apical patch in one or two examples is almost bisected by a finger of tawny orange ground colour, which, though interrupted at the veins, almost reaches to the costa. On the underside, the hind wing is grey, in most cases laved with golden yellow or occasionally reddish orange to a variable extent. The basal spots and the median series are pale leaden grey, and are arranged in a similar manner to those of *depicta*; their outer edges are defined by black. Dusky submarginal lunules are usually obvious, those in areas 1 to 4 being often accompanied inwardly by bright golden yellow lunules.

♀. Apart from the shape of the wings, similar to the male.

This is a most variable species, and further collecting may yet produce evidence that more than one species is involved. A male and female from Lange Valley to the south-east of Lambert's Bay have wide dark margins and a somewhat paler tawny orange ground colour. The underside of the hind wing in the male is blackish grey.

Holotype ♂. CAPE PROVINCE: Garies, 1,800 ft., 21.xi.1938 (*R. C. Wood*), B.M. Type No. Rh. 18579.

Paratypes. CAPE PROVINCE: as holotype, 1 ♂ (B.M.); Springbok, viii.1952 (*Lt.-Col. H. C. Bridges*), 3 ♂ (B.M.); Springbok (*G. van Son*), 3 ♂ (Tr.M.); 6 miles east of Springbok, 25.ix.1962 (*C. G. Dickson*), 1 ♂ (B.M.); between Koekenaap and Nieuwerust, 4.ix.1966 (*C. G. Dickson*), 1 ♂ (B.M.); Het Kruis, Piquetberg Div., 29.xii.1966 (*C. G. Dickson*), 1 ♂ (B.M.); O'okiep, 12.xii.1948 (*G. van Son*), 1 ♂ (Tr.M.); O'okiep (Trimen Coll.), 2 ♂ (B.M.); Strandfontein, W. Coast, 8.ix. 1964 (*K. M. Pennington*), 1 ♂, 1 ♀ (Penn.); near Clanwilliam, x.1950 (*N. A. Brauer*), 2 ♂, 3 ♀ (B.M.); Van Rhyn's Pass (*G. van Son*), 2 ♂ (Tr.M.); Gydo Pass, 1.xi.1965 (*C. D. Quickelberge*), 1 ♀ (Q.); Lange Valley, S.E. of Lambert's Bay, 18.ix.1963 (*C. G. Dickson*), 1 ♂, 1 ♀ (B.M.); Hondeklip, 11.xi.1933 (*G. van Son*), 1 ♀ (Tr.M.).

***Aloeides lutescens* sp. n.**

(Pl. 4, figs. 67, 68, 79, 80)

Length of fore wing: ♂ 13–14 mm.; ♀ 14·5 mm.

♂ Upperside, quite as pale a shade of tawny orange as that of *pallida pallida;* the margins are as in *depicta*, but definitely more narrow, and not so intensely black as those of *depicta apicalis*. The basal third of the costa is strongly scaled with yellow-buff. All the fringes are heavily checkered with white.

Underside, the orange area of the fore wing is pale yellowish orange, which only feebly contrasts with the straw-coloured costal and distal margins; the spotting is small and neat. The hind wing is of the same straw colour, the markings being dull silver, outlined with black in part; they are usually not very clearly defined. White marginal dots are present on all wings.

At present this insect is known only from Brand Vlei near Worcester; its distinctive appearance makes it appear probable that it represents a good species, and that it is not a race of one of the other members of the group. It has been found on sandy ground at the base of the hills, examples being met with from early summer to the middle of April.

Holotype ♂. CAPE PROVINCE: Below De Wets Berg, Brand Vlei, 3.i.1964 (*C. G. Dickson*), B.M. Type No. Rh. 18580.

Allotype ♀. As holotype, B.M. Type No. Rh. 18581.

Paratypes. As holotype, 1 ♂ (B.M.); Brand Vlei, near Worcester, 21.i.1965 (*C. G. Dickson*), 6 ♂ (B.M.).

***Aloeides egerides* (Riley) stat. n.**

(Pl. 5, figs. 95, 96, 108, 109)

Phasis thyra f. *egerides* Riley, 1938 : 238, pl.1. fig. 10, pl. 2, fig. 35, Simon's Town. (Type!)

Length of fore wing: ♂ 13 mm.; ♀ 14 mm.

♂ Upperside, differs from *lutescens* only by the apical patch of the hind wing being extended to a point nearly half-way along the costa. Underside, the hind wing is usually some shade of red; the conspicuous well separated silver-white markings make this an easy species to identify.

♀. This sex shows the usual difference in wing shape; it is in other respects similar to the male.

A local species, but in addition to the type locality, it has been found near Melkbosch Strand at Lambert's Bay, in the Mamre District, and on Piquetberg Mtn.

Examples studied. CAPE PROVINCE: Red Hill, Simon's Town (including types); Piquetberg; Lambert's Bay.

Aloeides margaretae sp. n.

(Pl. 4, figs. 70, 74, 82, 86)

Length of fore wing: ♂ 14–15 mm.; ♀ 15 mm.

♂ Upperside, in general appearance like *depicta depicta*, but the distal edge of the fore wing is almost completely straight, that of the hind wing being concave and the anal angle produced as in *depicta apicalis*. On the fore wing, the colour is clear bright tawny orange, of much the same tint as that of *egerides;* the apical patch, and distal band are clear-cut, but variable in width, the distal band varying between 2 and 3 mm. at its narrowest point (vein 3). On the hind wing, the apical patch is large and quadrate, but reaches only to one third the length of the costa. The fringes are distinctly checkered.

Underside, apart from the tawny orange area on the fore wing, the ground is usually dusky salmon-pink with an even smooth appearance, examples do occur with a more brownish tone. On the fore wing, the submarginal spots in areas 1 to 3 are black and rounded, that in area 1 being the largest; those from area 4 to the apex are either obsolete, or only faintly indicated by tiny whitish dots, each accompanied by a vague darkening of the ground. On the hind wing, the basal spots are small, but white and very distinct; there is a tiny but similar median costal spot in area 7, a larger one in the middle of the cell, followed by an irregular bar at the cell-end. The median series is represented by a straight, soiled white or grey stripe extending across the wing from below the cell in area 1 to vein 5, with indications of a separate spot above that vein; the median spots in areas above vein 6 are absent. A pale blur in areas 3 and 4, and a whitish anal spot are the only indications of the submarginal series.

♀. There is the usual sexual difference in the wing-shape. On the underside of hind wing, the median series is sharply angled at vein 5, turning back towards the base of the wing, terminating at vein 6. Otherwise, the sexes are similar.

This species is named, with pleasure, after Mrs. K. Margaret Wykeham who captured a number of specimens when collecting butterflies to the south of Lambert's Bay on the 4th and 5th of September 1966. It is one of a number of interesting and rare Lycaenidae which she has secured over a period of many years.

Holotype ♂. CAPE PROVINCE: South of Lambert's Bay, 5.ix.1966 (*C. G. Dickson*), B.M. Type No. Rh. 18582.

Allotype ♀. CAPE PROVINCE: Spion Kop, 15 miles S.E. of Lambert's Bay, 5.ix.1966 (*C. G. Dickson*), B.M. Type No. Rh. 18583.

Paratypes. CAPE PROVINCE: Piquetberg Mtn., 22.iii.1957 (*C. G. Dickson*), 1 ♂ (B.M.); as holotype, 1 ♂, 1 ♀.

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ADDENDUM

Subsequent to going to press, study of the detailed and careful drawings of the late Mr. Gowan Clark revealed that the species described below has been misidentified as *A. clarki*. These drawings are reproduced on Plates 6, 7, and 8.

Aloeides gowani sp. n.

(Pl. 4, figs. 69, 81; Pl. 6, figs. 1–21)

Length of fore wing: ♂ 14 mm.; ♀ 14–15mm.

Both sexes are very similar to *clarki*. On the fore wing underside, the intricate submarginal pattern as described in *clarki* is present, but it is by no means so neat or distinct. The same surface of the hind wing is of a paler, more loam-brown colour, the pattern being far less obvious, and less precise.

It is unfortunate that Gowan Clark's only larva of *clarki* died before attaining the fifth instar, but sufficient details were recorded (Pl. 7) to confirm the separation of *gowani* from that species; the most noticeable character being the great contrast in size and pattern of the reticulations on the surface of the eggshell.

Holotype ♂. Cape Province: Naauwpoort (*G. C. Clark*). B.M. Type No. Rh. 17011.

Allotype ♀. As holotype, B.M. Type No. Rh. 17012.

Paratypes. As holotype, 1 ♂, 1 ♀ (B.M.); Sheldon, 6.xii.1932 (*G. C. Clark*) 2 ♂, 3 ♀ (Tr.M.); Sheldon, xi.1940 (*G. C. Clark*) 2 ♀ (B.M.); Burghersdorp, 5.i.1967 (*Mrs. R. Southey*) 1 ♀ (B.M.); Burghersdorp, xi.1947 (ex T. H. E. Jackson coll.) 1 ♂ (B.M.); Kendrew, 21.iii.1940 (*G. van Son*) 1 ♀ (Tr.M.); Molteno, 5.xi.1961 (*N. A. Brauer*) 1 ♂.

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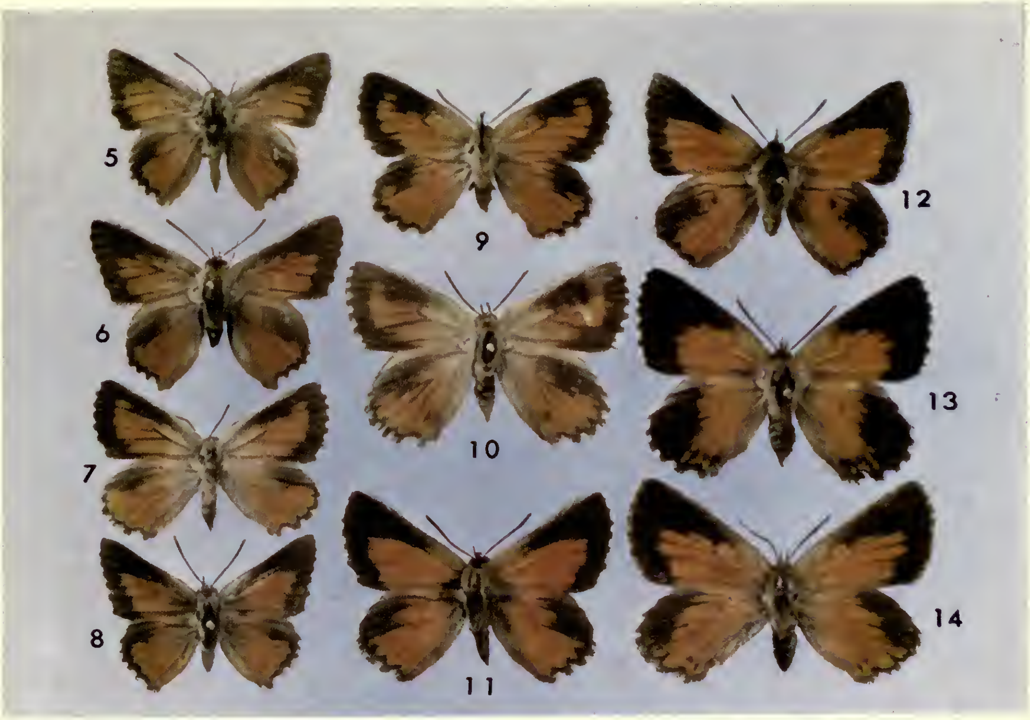
PLATE 1

(Uppersides B.M.(N.H.) Neg. No. 44895)

Fig. 5. *Aloeides thyra*, ♂, (Cape Town)
Fig. 6. *A. thyra*, ♂, (Cape Town)
Fig. 7. *A. thyra*, ♀, (Cape Town)
Fig. 8. *A. thyra*, ♂, (Matjesfontein)
Fig. 9. *A. thyra*, ♀, (Matjesfontein)
Fig. 10. *A. thyra*, ♀, (Cape Town)
Fig. 11. *A. pallida grandis*, ♂, (Grootvadersbos)
Fig. 12. *A. pallida grandis*, ♂, holotype (Du Toit's Kloof)
Fig. 13. *A. pallida grandis*, ♀, allotype (Du Toit's Kloof)
Fig. 14. *A. pallida grandis*, ♀, (Grootvadersbos)

(Undersides B.M.(N.H.) Neg. No. 44894)

Fig. 15. *Aloeides thyra*, ♂, (Cape Town)
Fig. 16. *A. thyra*, ♂, (Cape Town)
Fig. 17. *A. thyra*, ♀, (Cape Town)
Fig. 18. *A. thyra*, ♂, (Matjesfontein)
Fig. 19. *A. thyra*, ♀, (Matjesfontein)
Fig. 20. *A. thyra*, ♀, (Cape Town)
Fig. 21. *A. pallida grandis*, ♂, (Grootvadersbos)
Fig. 22. *A. pallida grandis*, ♂, holotype (Du Toit's Kloof)
Fig. 23. *A. pallida grandis*, ♀, allotype (Du Toit's Kloof)
Fig. 24. *A. pallida grandis*, ♀, (Grootvadersbos)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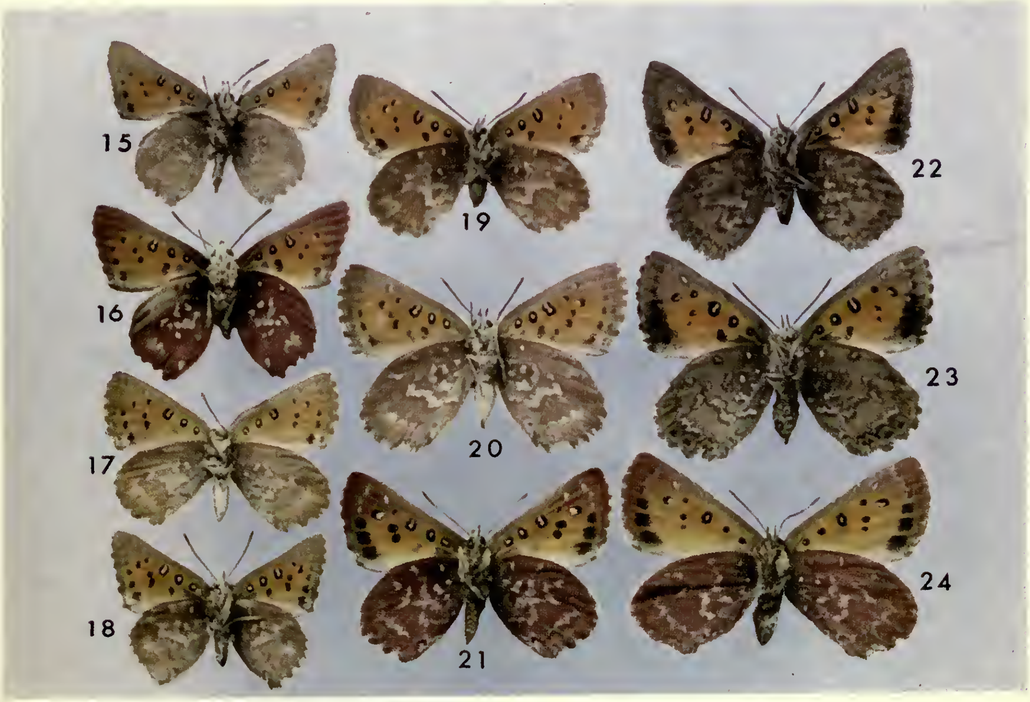
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PLATE 2

(Uppersides B.M.(N.H.) Neg. No. 44896)

Fig. 25. *Aloeides pallida littoralis*, ♂, (Knysna)
Fig. 26. *A. pallida littoralis*, ♀, allotype (Knysna)
Fig. 27. *A. braueri*, ♂, holotype (Queenstown)
Fig. 28. *A. pallida pallida*, ♂, holotype (Steynsburg)
Fig. 29. *A. pallida pallida*, ♀, (Steynsburg)
Fig. 30. *A. braueri*, ♀, allotype (Queenstown)
Fig. 31. *A. dentatis dentatis*, ♂, (Witpoortjie, Transvaal)
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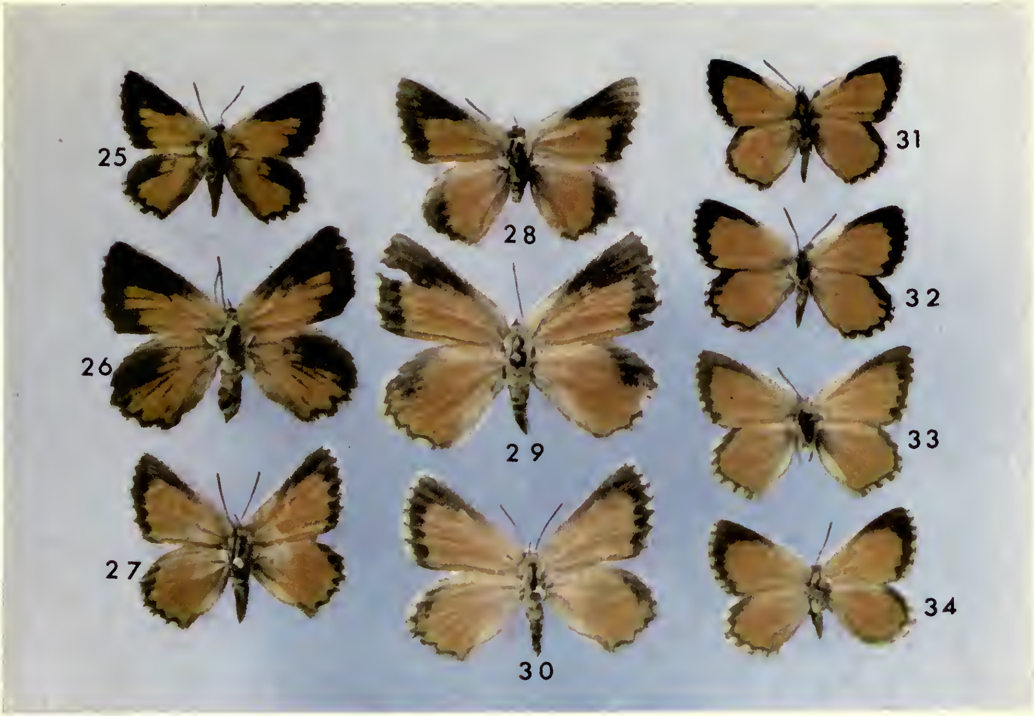
Fig. 34. *A. dentatis maseruna*, ♀, (Maseru, Basutoland)

(Undersides B.M.(N.H.) Neg. No. 44897)

Fig. 35. *Aloeides pallida littoralis*, ♂, (Knysna)
Fig. 36. *A. pallida littoralis*, ♀, allotype (Knysna)
Fig. 37. *A. braueri*, ♂, holotype (Queenstown)
Fig. 38. *A. pallida pallida*, ♂, holotype (Steynsburg)
Fig. 39. *A. pallida pallida*, ♀, (Steynsburg)
Fig. 40. *A. braueri*, ♀, (Queenstown)
Fig. 41. *A. dentatis dentatis*, ♂, (Witpoortjie, Transvaal)
Fig. 42. *A. dentatis dentatis*, ♀, (Witpoortjie, Transvaal)
Fig. 43. *A. dentatis maseruna*, ♂, (Maseru, Basutoland)
Fig. 44. *A. dentatis maseruna*, ♀, (Maseru, Basutoland)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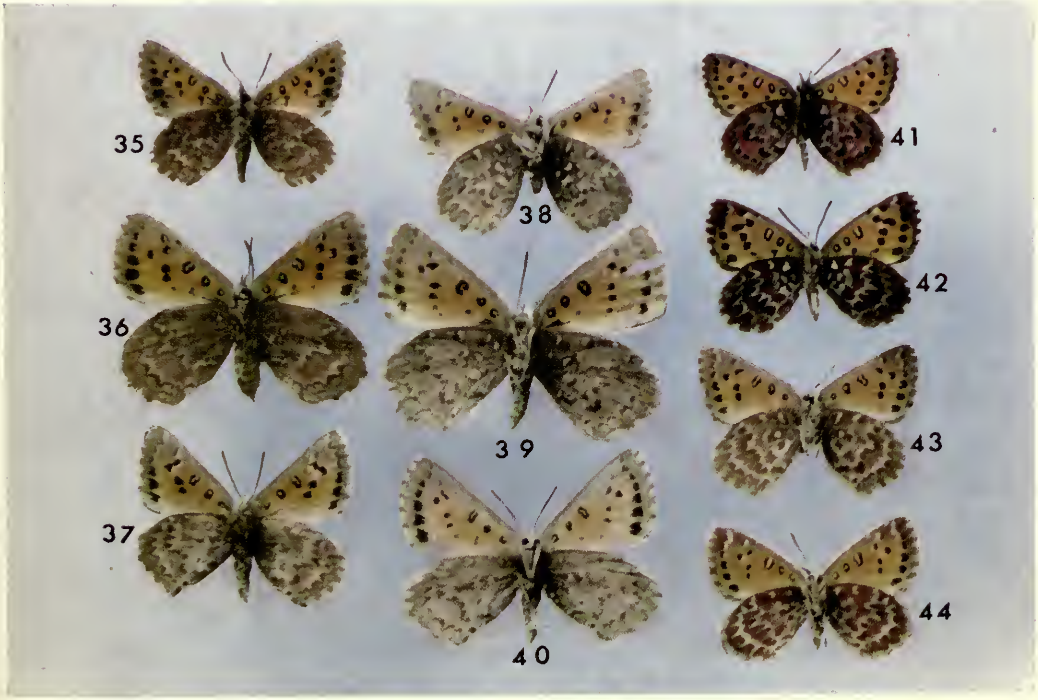
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PLATE 3

(Uppersides B.M.(N.H.) Neg. No. 44898)

Fig. 45. *Aloeides simplex*, ♂, lectotype (Damaraland)
Fig. 46. *A. simplex*, ♂, (Aus, S.W. Afr.)
Fig. 47. *A. simplex*, ♀, (Aus, S.W. Afr.)
Fig. 48. *A. vansoni juana*, ♂, holotype (3½ mls. S. of Ladismith, C.P.)
Fig. 49. *A. vansoni vansoni*, ♂, holotype (Matjesfontein)
Fig. 50. *A. vansoni vansoni*, ♀, allotype (Matjesfontein)
Fig. 51. *A. vansoni juana*, ♀, allotype (Willowmore)
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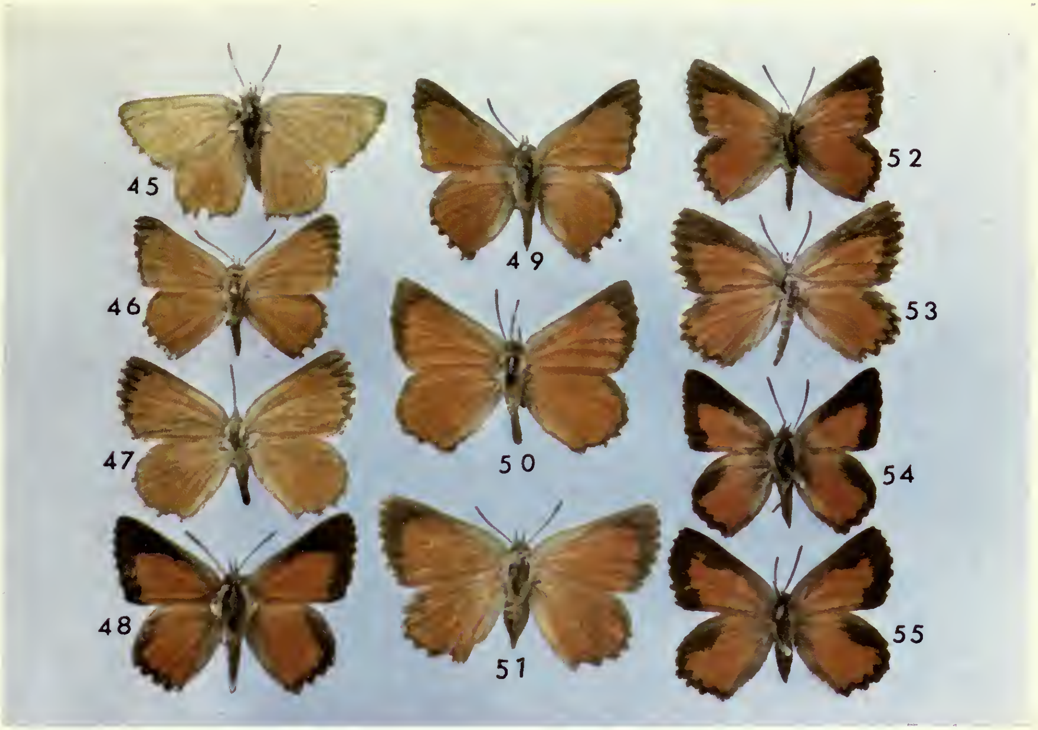
Fig. 54. *A. quickelbergei*, ♂, holotype (Robinson Pass)
Fig. 55. *A. quickelbergei*, ♀, allotype (Robinson Pass)

(Undersides B.M.(N.H.) Neg. No. 44899)

Fig. 56. *Aloeides simplex*, ♂, lectotype (Damaraland)
Fig. 57. *A. simplex*, ♂, (Aus, S.W. Afr.)
Fig. 58. *A. simplex*, ♀, (Aus, S.W. Afr.)
Fig. 59. *A. vansoni juana*, ♂, holotype (3½ mls. S. of Ladismith, C.P.)
Fig. 60. *A. vansoni vansoni*, ♂, holotype (Matjesfontein)
Fig. 61. *A. vansoni vansoni*, ♀, allotype (Matjesfontein)
Fig. 62. *A. vansoni juana*, ♀, allotype (Willowmore)
Fig. 63. *A. depicta depicta*, ♂, (Port Elizabeth)
Fig. 64. *A. depicta depicta*, ♀, (Port Elizabeth)
Fig. 65. *A. quickelbergei*, ♂, holotype (Robinson Pass)
Fig. 66. *A. quickelbergei*, ♀, allotype (Robinson Pass)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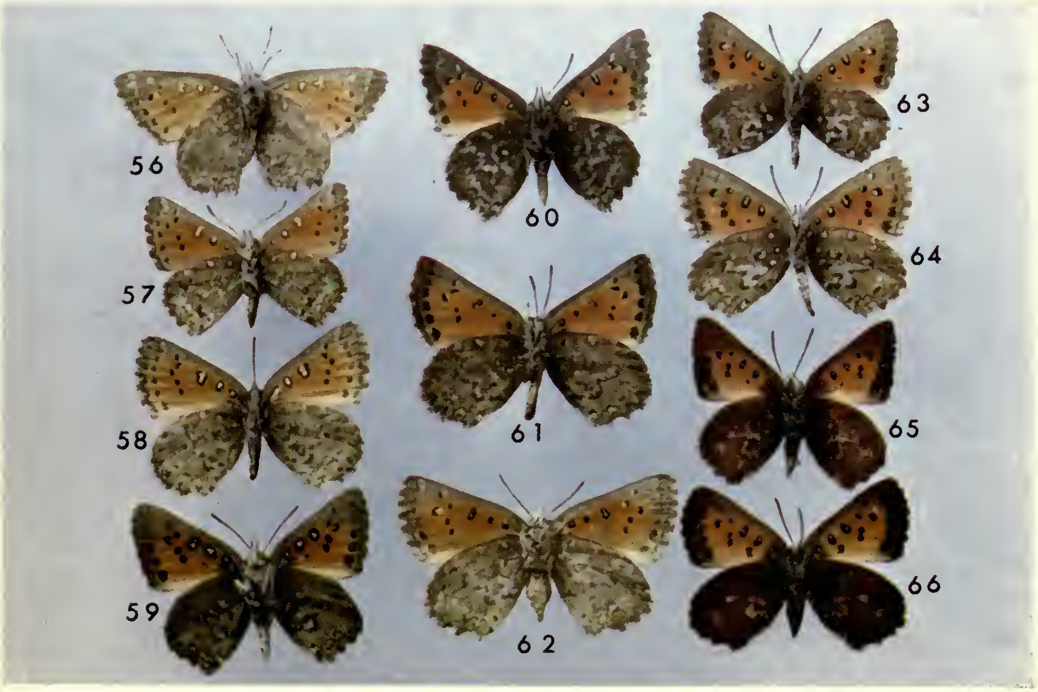
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PLATE 4

(Uppersides B.M.(N.H.) Neg. No. 44900)

Fig. 67. *Aloeides lutescens*, ♂, holotype (Brand Vlei, C.P.)
Fig. 68. *A. lutescens*, ♀, allotype (Brand Vlei, C.P.)
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Fig. 74. *A. margaretae*, ♀, allotype (Spion Kop, 15 mls. S.E. of Lambert's Bay)
Fig. 75. *A. arida*, ♂, (Clanwilliam)
Fig. 76. *A. arida*, ♀, (Clanwilliam)
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Fig. 78. *A. clarki*, ♀, allotype (Aloes-Coega Flats)

(Undersides B.M.(N.H.) Neg. No. 44901)

Fig. 79. *Aloeides lutescens*, ♂, holotype (Brand Vlei, C.P.)
Fig. 80. *A. lutescens*, ♀, allotype (Brand Vlei, C.P.)
Fig. 81. *A. gowani*, ♂, (Molteno, C.P.)
Fig. 82. *A. margaretae*, ♂, holotype (S. of Lambert's Bay)
Fig. 83. *A. arida*, ♂, (Lange Valley, S.E. of Lambert's Bay)
Fig. 84. *A. arida*, ♀, (Lange Valley, S.E. of Lambert's Bay)
Fig. 85. *A. arida*, ♂, (S. of Lambert's Bay)
Fig. 86. *A. margaretae*, ♀, allotype (Spion Kop, 15 mls. S.E. of Lambert's Bay)
Fig. 87. *A. arida*, ♂, (Clanwilliam)
Fig. 88. *A. arida*, ♀, (Clanwilliam)
Fig. 89. *A. clarki*, ♂, holotype (Aloes-Coega Flats)
Fig. 90. *A. clarki*, ♀, allotype (Aloes-Coega Flats)

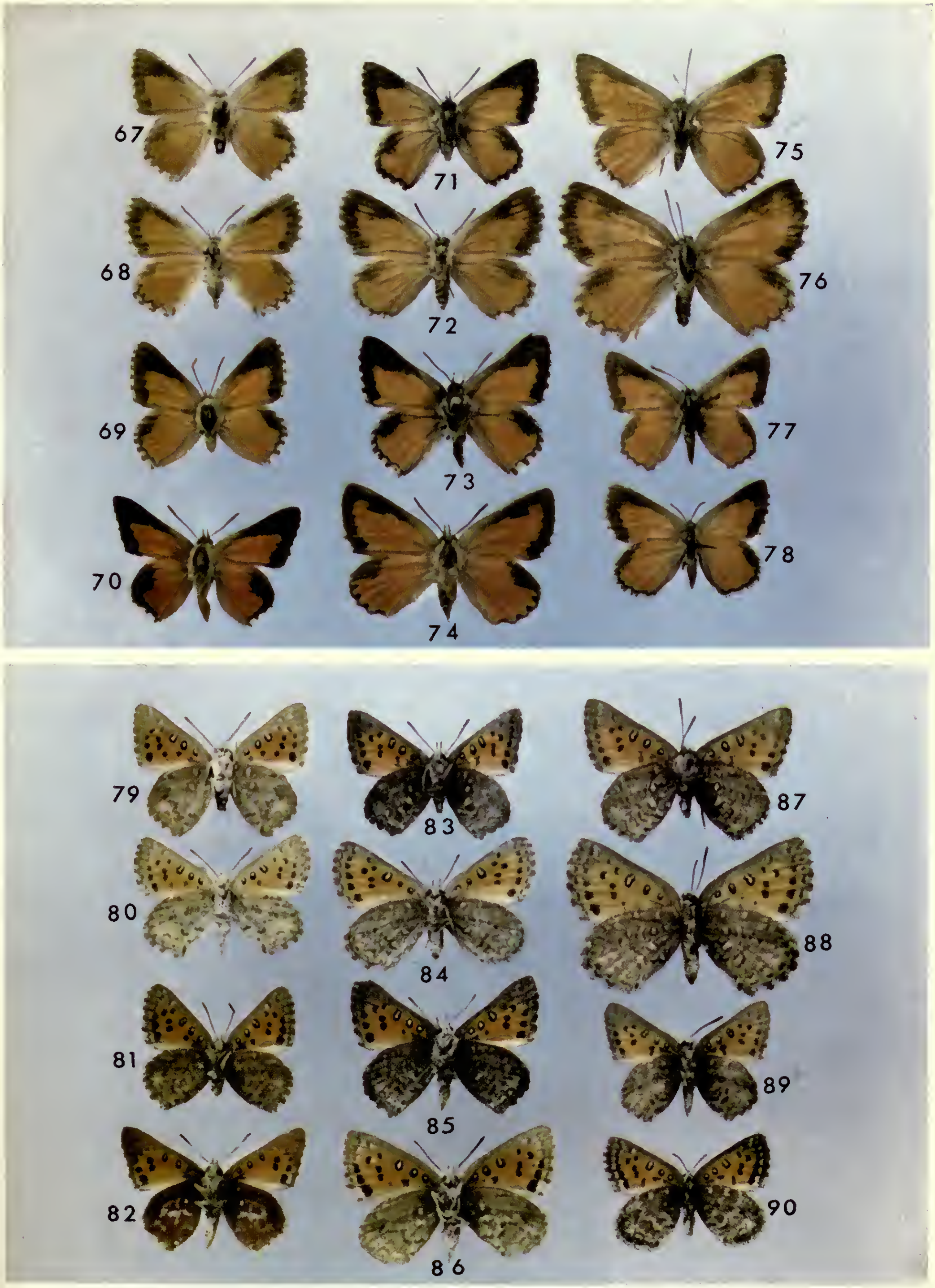
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PLATE 5

(Uppersides B.M.(N.H.) Neg. No. 44902)

Fig. 91. *Aloeides dryas*, ♂, holotype (Zoutpansberg, Transvaal)
Fig. 92. *A. dryas*, ♀, paratype (Zoutpansberg, Transvaal)
Fig. 93. *A. natalensis*, ♂, (Natal)
Fig. 94. *A. natalensis*, ♀, (Natal)
Fig. 95. *A. egerides*, ♂, holotype (Red Hill, Simon's Town)
Fig. 96. *A. egerides*, ♀, paratype (Red Hill, Simon's Town)
Fig. 97. *A. arida*, ♂, holotype (Garies, C.P.)
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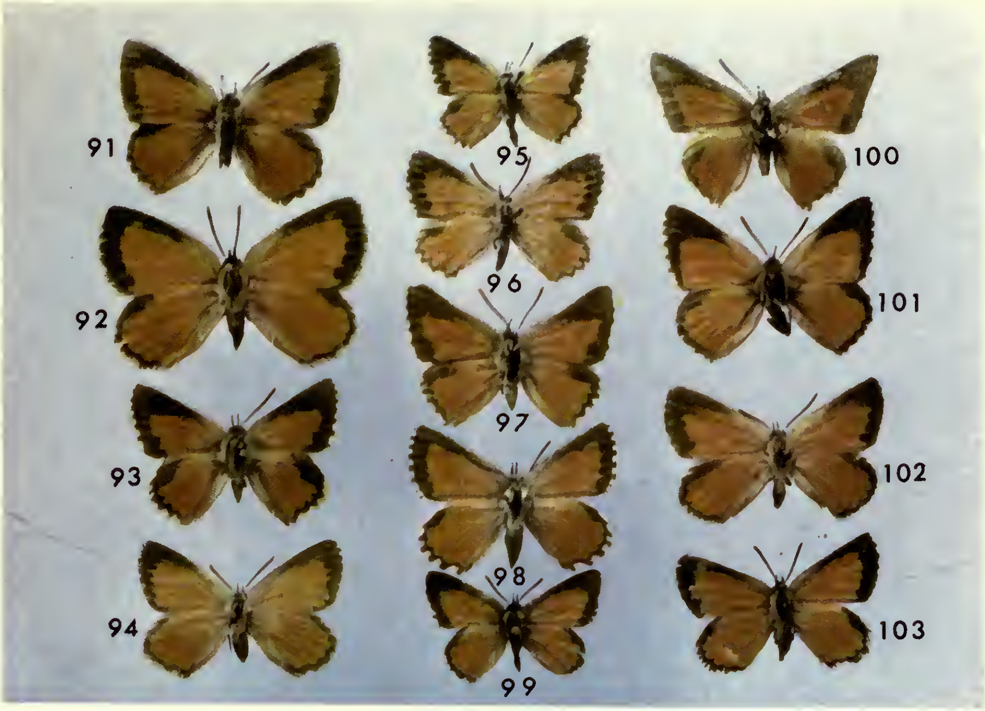
Fig. 99. *A. oreas*, ♂, (Stutterheim, C.P.)
Fig. 100. *A. depicta apicalis*, ♂, (O'okiep, L. Namaqualand)
Fig. 101. *A. penningtoni*, ♂, (Durban, Natal)
Fig. 102. *A. penningtoni*, ♀, (Natal)
Fig. 103. *A. oreas*, ♀, (Stutterheim)

(Undersides B.M.(N.H.) Neg. No. 44903)

Fig. 104. *Aloeides dryas*, ♂, holotype (Zoutpansberg, Transvaal)
Fig. 105. *A. dryas*, ♀, paratype (Zoutpansberg, Transvaal)
Fig. 106. *A. natalensis*, ♂, (Natal)
Fig. 107. *A. natalensis*, ♀, (Natal)
Fig. 108. *A. egerides*, ♂, holotype (Red Hill, Simon's Town)
Fig. 109. *A. egerides*, ♀, paratype (Red Hill, Simon's Town)
Fig. 110. *A. arida*, ♂, holotype (Garies, C.P.)
Fig. 111. *A. arida*, ♀, paratype (Hondeklip Bay, C.P.)
Fig. 112. *A. oreas*, ♂, (Stutterheim, C.P.)
Fig. 113. *A. depicta apicalis*, ♂, (O'okiep, L. Namaqualand)
Fig. 114. *A. penningtoni*, ♂, (Durban, Natal)
Fig. 115. *A. penningtoni*, ♀, (Natal)
Fig. 116. *A. oreas*, ♀, (Stutterheim)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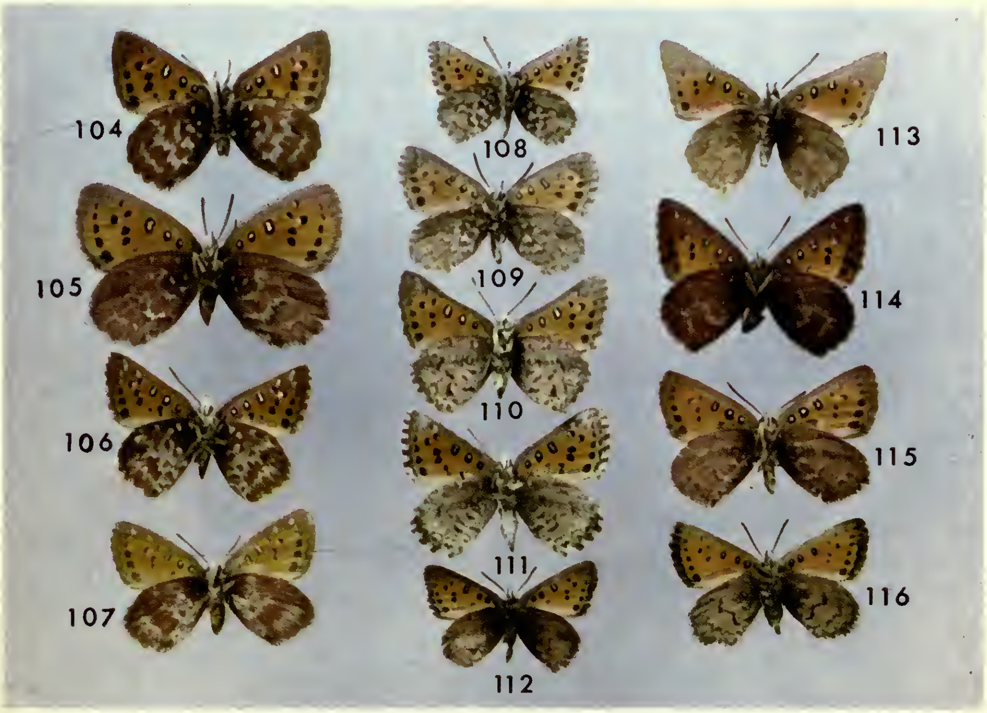
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PLATE 6

Aloeides gowani (Naauwpoort)

Fig. 1. Imago, ♂ (upper and under side).
Fig. 2. Ovum, ×18*.
Fig. 3. Larva, 1st instar (cross-section).
Fig. 4. Larva, 1st instar
Fig. 5. Larva, 1st instar (head).
Fig. 6. Larva, 1st instar (7th segment). ×75.
Fig. 7. Larva, 2nd instar
Fig. 8. Larva, 2nd instar (7th segment). ×35.
Fig. 9. Larva, 3rd instar
Fig. 10. Larva, 3rd instar (7th segment). ×20.
Fig. 11. Larva, 4th instar
Fig. 12. Larva, 4th instar (7th segment). ×12.
Fig. 13. Larva, 5th instar
Fig. 14. Larva, 5th instar (7th segment). ×9.
Fig. 15. Larva, 5th instar (head).
Fig. 16. Larva, final instar
Fig. 17. Larva, final instar (7th segment). ×6.
Fig. 18. Larva, final instar (spiracle).
Fig. 19. Larva, final instar (tubercle extended)
Fig. 20. Larva, final instar (posterior segments)
Fig. 21. Pupa.

* Scales of magnification are given only when they are available in Clark's notes.

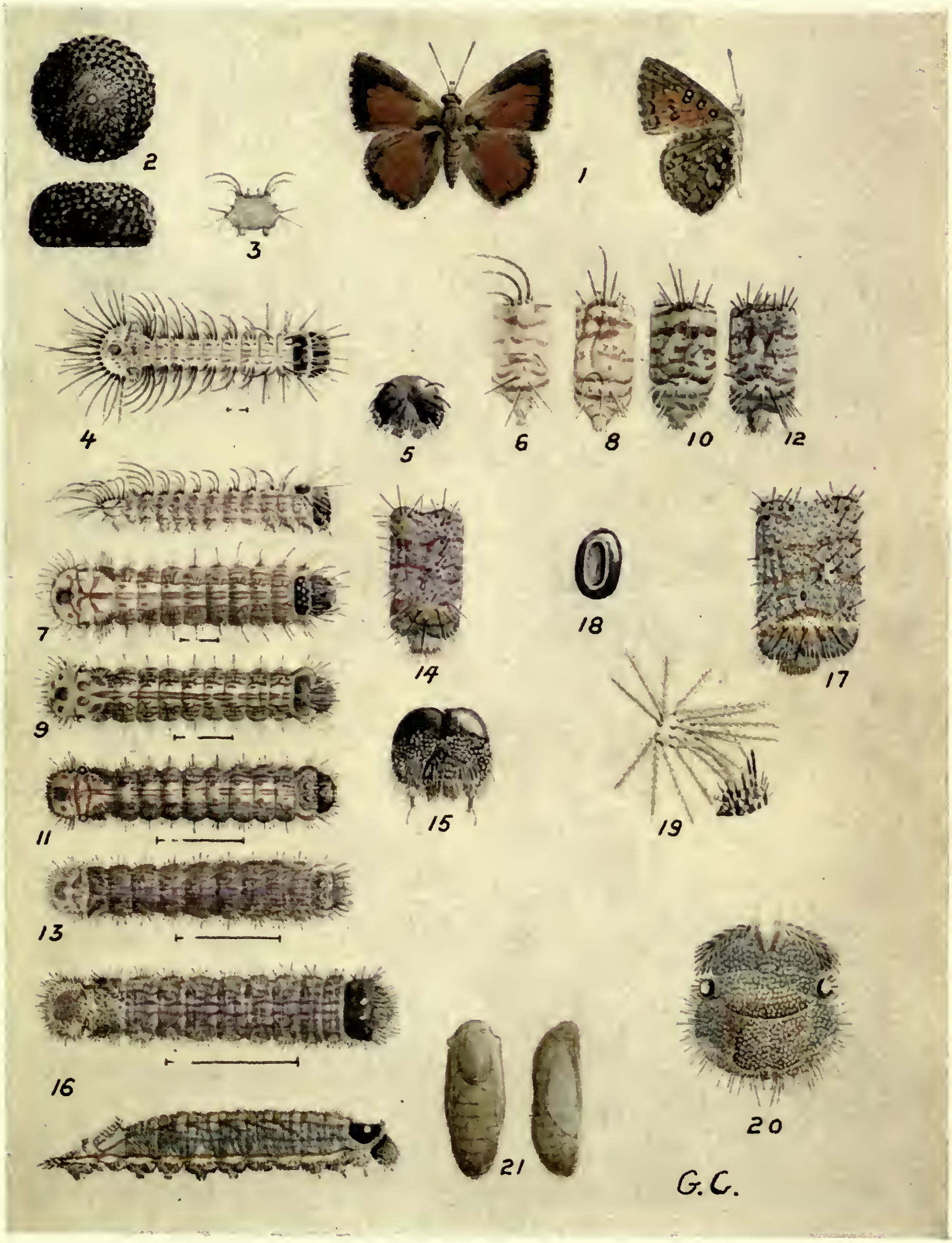
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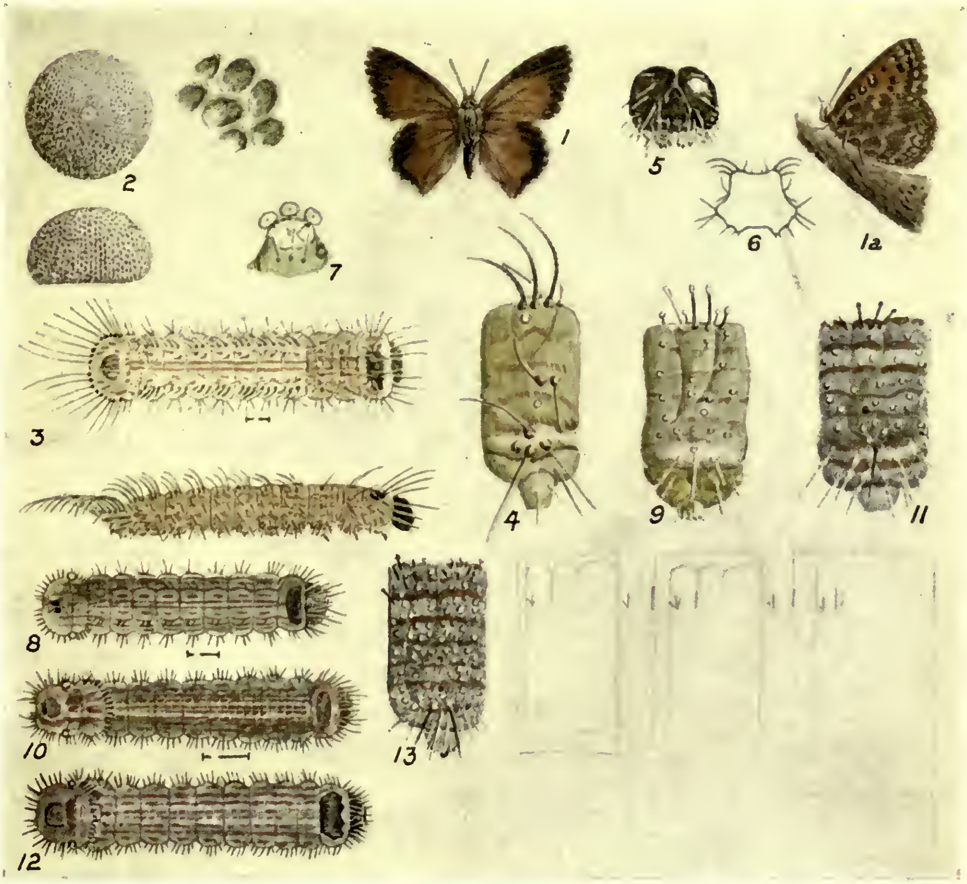
PLATE 7

Aloeides clarki (Aloes-Coega Flats)

Fig. 1.	Imago, ♂ (upperside).	
Fig. 1a.	Imago, ♀ (underside).	
Fig. 2.	Ova (enlarged).	
Fig. 3.	Larva, 1st instar	
Fig. 4.	Larva, 1st instar (7th segment).	
Fig. 5.	Larva, 1st instar (head).	
Fig. 6.	Larva, 1st instar (cross-section).	
Fig. 7.	Larva, 1st instar (retracted tubercle)	
Fig. 8.	Larva, 2nd instar	
Fig. 9.	Larva, 2nd instar (7th segment).	× 60.
Fig. 10.	Larva, 3rd instar	
Fig. 11.	Larva, 3rd instar (7th segment).	× 35.
Fig. 12.	Larva, 4th instar	
Fig. 13.	Larva, 4th instar (7th segment).	× 20.

Aloeides pallida

Fig. 14.	Imago, ♂ (upperside).
Fig. 14a.	Imago, ♂ (underside).
Fig. 15.	Ovum.
Fig. 16.	Larva, 1st instar
Fig. 17.	Larva, 1st instar (7th segment).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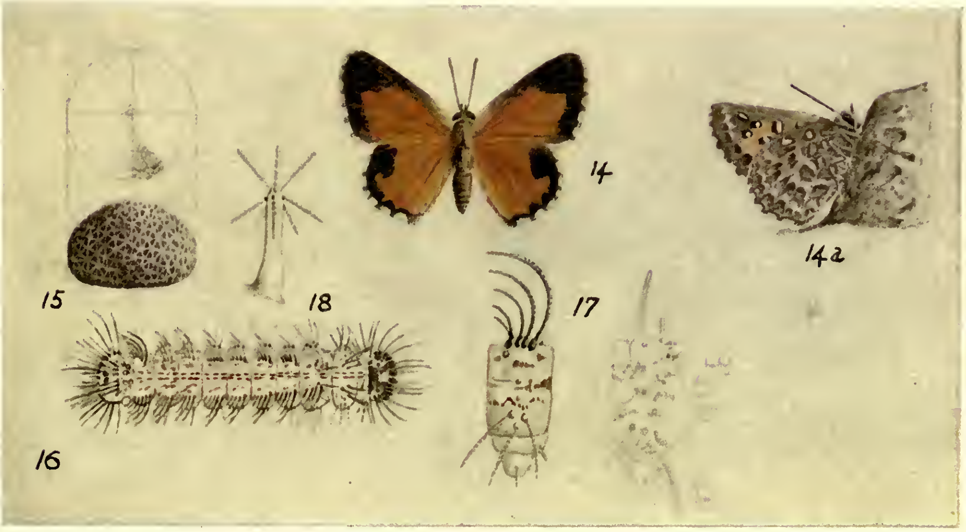
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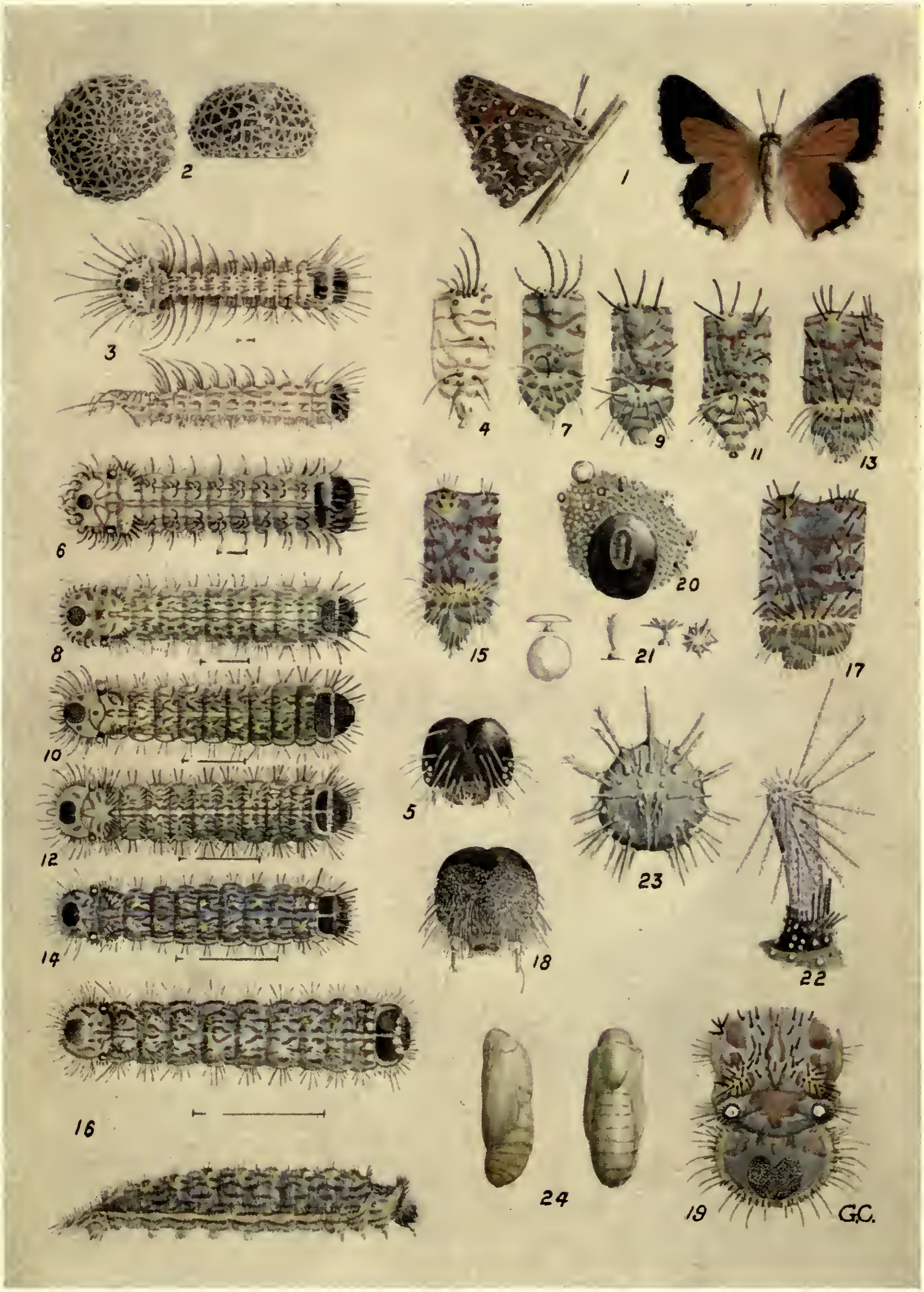
PLATE 8

Aloeides depicta (Port Elizabeth)

Fig. 1. Imago, ♂ (under and upper sides).
Fig. 2. Ova. × 20.
Fig. 3. Larva, 1st instar
Fig. 4. Larva, 1st instar (7th segment). × 45.
Fig. 5. Larva, 1st instar (head). × 50.
Fig. 6. Larva, 2nd instar
Fig. 7. Larva, 2nd instar (7th segment). × 30.
Fig. 8. Larva, 3rd instar
Fig. 9. Larva, 3rd instar (7th segment). × 18.
Fig. 10. Larva, 4th instar
Fig. 11. Larva, 4th instar (7th segment). × 15.
Fig. 12. Larva, 5th instar
Fig. 13. Larva, 5th instar (7th segment). × 12.
Fig. 14. Larva, 6th instar
Fig. 15. Larva, 6th instar (7th segment). × 9.
Fig. 16. Larva, final instar (dorsal and lateral view).
Fig. 17. Larva, final instar (7th segment). × 7.
Fig. 18. Larva, final instar (head). × 6.
Fig. 19. Larva, final instar (last four segments).
Fig. 20. Larva, final instar (spiracle).
Fig. 21. Larva, final instar (different types of sela).
Fig. 22. Larva, final instar (extended tubercle).
Fig. 23. Larva, final instar (top of tubercle).
Fig. 24. Pupae. × 2.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P. VIETTE and D. S. FLETCHER

BULLETIN OF
THE BRITISH MUSEUM (NATURAL HISTORY)
ENTOMOLOGY Vol. 21 No. 8
LONDON: 1968

THE TYPES OF LEPIDOPTERA HETEROCERA DESCRIBED BY P. MABILLE x-ref.

BRITISH MUSEUM
23 APR 1968
NATURAL HISTORY

BY

P. VIETTE x-ref.
Muséum national d'Histoire naturelle, Paris

and

D. S. FLETCHER x-ref.
British Museum (Natural History)

Pp. 389–425.

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ENTOMOLOGY Vol. 21 No. 8
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THE TYPES OF LEPIDOPTERA HETEROCERA DESCRIBED BY P. MABILLE

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SYNOPSIS

The 520 species and forms of Lepidoptera Heterocera described by P. Mabille are listed. They are arranged in families and within each family the original combinations are listed alphabetically. Each name is followed by the original reference; subsequent references relate to the publication of lectotype or neotype designations or to figures of the types. Pin-data and present location are given for the 418 types so far recognized and 70 lectotypes are designated. A full bibliography and an index are included.

In 1954 Viette published a list of 120 types of Mabille species of Madagascan Heterocera that he had recognized in the collection of the Muséum national d'Histoire naturelle in Paris (Viette, 1954 : 377–387). Mabille (1835–1923), a French lepidopterist specializing in Hesperiidae (Lepidoptera Rhopalocera), described also over 500 species of Heterocera from the Mediterranean area, from Africa and Madagascar, from New Guinea and Fiji and from Patagonia during the latter half of the nineteenth century. Mabille described species not only from his own collection but also from the collections of many of his contemporaries, notably H. G. Smith, Staudinger, Thierry-Mieg, Joannis and Charles Oberthür and from the collection of the Paris Museum. Only rarely did Mabille label a type as such, so that not only are his types widely dispersed, but they have in the main been unrecognized until recently. After his death in 1923, Mabille's collection of Lepidoptera, which included that of his father-in-law Rambur, passed to Réné Oberthür from whom his brother, Charles Oberthür, received most of the exotic Heterocera. Part of this material was bought by the British Museum (Natural History) in 1926. In 1953 further African and Madagascan types of Mabille were found in the collection of Réné Oberthür at Rennes and are now in the Paris Museum and in the collection of Monsieur Cl. Herbulot in Paris.

Since the publication of the 1954 list, a further 82 Mabille types have been recognized in the Paris Museum and 177 have been recognized in the British Museum (Natural History). Twenty Mabille types are the collection of Monsieur Herbulot; the types of twelve species that Mabille described from the Staudinger collection are in the Zoological Museum in Berlin; six Sphingidae types bought by Preston Clark are now in the Carnegie Museum in Pittsburgh and one type from the Thierry-Mieg collection, bought by Paul Dognin, is now in the United States National Museum in Washington.

The present catalogue includes the names of all the 520 species of Lepidoptera Heterocera described by Mabille. Pin-data and present location are given for each of the 418 types so far recognized; a colon separates the data from successive labels. The names of the remaining 102 species, for which no type has yet been recognized, are included in the hope that their publication may stimulate further searches. Species are listed by families; within each family the original combinations are listed alphabetically. Each name is followed by the original reference in an abbreviated form; references following the original, include authors' names and relate to the publication of lectotype and neotype designations and to illustrations of type specimens. The word lectotype printed in capital letters thus, LECTOTYPE, indicates a designation published for the first time. A full bibliography follows the text.

The following abbreviations of institutions have been used:

B.M. (N.H.)	British Museum (Natural History), London.
C.M.P.	Carnegie Museum, Pittsburgh.
M.N.P.	Museum national d'Histoire naturelle, Paris.
U.S.N.M.	United States National Museum, Washington.
Z.M.B.	Zoological Museum, Berlin.

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HEPIALIDAE

Hepialus fuscus, 1885 : 56. Patagonia. Not found.

COSSIDAE

Cossus breviculus, 1880 : 344. Viette, 1951 : 135. Viette, 1954 : 378. Holotype ♂: Madagascar (coll. Mabille < coll. Ch. Oberthür < coll. R. Biederman). In M.N.P.

Endagria locuples see Thyrididae.

TORTRICIDAE

Bactra distictana, 1900 : 751. Madagascar. Not found.

Bactra punctistrigana, 1900 : 751. Viette, 1954 : 379. Lectotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Conchylis unicolorana, 1900 : 750. Viette, 1954 : 379. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In. M.N.P.

Grapholita atrana, 1900 : 751. Viette, 1954 : 379. Holotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Penthina apicinudana, 1900 : 750. Viette, 1954 : 379. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Retinia argyromixtana, 1900 : 751. Viette, 1954 : 379. Lectotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Steganoptycha albosectana, 1900 : 752. Viette, 1954 : 379. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Steganoptycha arciferana, 1900 : 752. Viette, 1954 : 379. Lectotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Steganoptycha leucospilana, 1900 : 753. Viette, 1954 : 379. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Steganoptycha pusillana, 1900 : 753. Viette, 1954 : 379. Holotype ♀ (sans tête): Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Steganoptycha selenana, 1900 : 752. Viette, 1954 : 379. Lectotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Syngamoneura rubronotana, 1900 : 750. Viette, 1954 : 380 (as *rubronotata*). Holotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P. (Espèce type du genre.)

Tortrix ocellata, 1900 : 750. Viette, 1954 : 380. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Tortrix rubrostrigana, 1900 : 749. Viette, 1954 : 380. Lectotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Tortrix saclava, 1900 : 749. Viette, 1954 : 380. Lectotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Tortrix stipulaceana, 1900 : 749. Viette, 1954 : 380. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

PSYCHIDAE

Oeceticus saclavus, 1890*a* : 52. Viette, 1954 : 379. Holotype ♂: Madagascar (coll. Joannis). In M.N.P.

Psyche joannisii, 1888*a* : lxvii. Viette, 1954 : 379. Lectotype ♂: Madagascar (coll. Joannis). In M.N.P.

TINEIDAE

Tinea galeatella, 1888 : 34, pl. 3 : 10. Holotype ♀: Archipel. du Cap Horn, baie Orange (*Hyades et Hahn*). In M.N.P.

Trichophaga deserticola, 1907*a* : 79. Holotype ♂: Tunisie, Kébili, mars 1906. In M.N.P.

AEGERIIDAE

Melittia iridisquama, 1890 : 34. Holotype ♀: W. Africa. In M.N.P.

Sesia setodiformis, 1892 : clxxiv. Viette, 1954 : 379. Holotype ♀: Madagascar, forêt de l'Est, Andrangoloaka (*A. Grandidier*). In M.N.P.

GELECHIIDAE

Lita suaedicola, 1906*a* : 54, pl. 3 : 5 (type figured). Holotype ♀: Ile d'Oleron. In M.N.P.

Gelechia tripartitella, 1907*a* : 79. Holotype ♂: Tunisie, Nefta, mai 1904 (*Daniel Lucas*). In M.N.P.

ZYGAENIDAE

Asthenia ? flavicapilla, 1880 : 345. Madagascar. Not found.

Glaucopis iridea, 1892*b*: cxxxviii. Mabille & Vuillot, 1895 : 159, pl. 22 : 4. Holotype ♀: Glaucopis iridea Mab. Sierra Leone 87 Pr.: Holotypus: coll. Staudinger. In Z.M.B.

Glaucopis pelidne, 1890 : 35. Holotype ♂: Gl. pelidne Mab. Côte ouest [Sierra Leone]: Ex musaeo P. Mabille 1923: Coll. Ch. Oberthür: Rothschild Bequest B.M. 1939–1. In B.M. (N.H.).

Himantopterus fulveolans, 1898 : 221. Holotype ♂: Himant. fulveolans Mab.: afr. cent. [afrique centrale]: Ex musaeo P. Mabille 1923: Coll. Ch. Oberthur: Rothschild Bequest B.M. 1939–1. In B.M. (N.H.).

Naclia ? erythrogaster, 1892*b* : cxxxix. Mabille & Vuillot, 1895 : 148, pl. 21 : 1. Sierra Leone. Not found.

Syntomis culiculina, 1879*a* : 85. LECTOTYPE ♀: G. ? culiculina Mab. Mad. [Madagascar]: Ex musaeo P. Mabille 1923: Coll. Ch. Oberthür: Rothschild Bequest B.M. 1939–1: Zygaenidae genitalia slide No. 1108. In B.M. (N.H.).

Syntomis parvipuncta, 1890 : 35. Holotype ♂: Syntomis parvipuncta P. Mab. Congo: parvipuncta Congo: Biblysia latipes Wlk. parvipuncta Mab. Zyg. ex D. Hamps.: Coll. Ch. Oberthür: Rothschild Bequest B.M. 1939–1: Zygaenidae ♂ genitalia slide No. 965. In B.M. (N.H.).

Zygaena cyanoxantha, 1893 : 57. Mabille & Vuillot, 1895 : 151, pl. 21 : 6. LECTOTYPE ♀: Abyssinia, Hildebr.: Origin: Z. cyanoxantha Mab. type: Genitalia preparation ZMB 6. In Z.M.B.

Zygaena eudaemon, 1885 : 57. Bernardi & Viette, 1961 : 142. Lectotype ♂: Algeria: Eudaemon Mab.: *felix mauritanica* Stdgr.: Et. Ent. XIII(1), pl. 7, fig. 70: Type Mabille: Ex Musaeo P. Mabille 1923. In M.N.P.

Zygaena holoxanthina, 1892*b* : cxxxviii. Mabille & Vuillot, 1895 : 159, pl. 22 : 5. Holotype ♀: *Zygaena holoxanthina* Mab. [Kenya] Kitui Mai, Hild. In Z.M.B.

Zygaena mauritanica, 1885 : 57. Bernardi & Viette, 1961 : 144. Lectotype ♀: Algeria: *Z. mauritanica* Mab.: Type Mabille: Ex Musaeo P. Mabille 1923: genitalia ♀, prep. P. Viette No. 3912. In M.N.P.

Zygaena octo, 1892*b* : cxxxviii. Mabille & Vuillot, 1895 : 150, pl. 21 : 5. Transvaal. Not found.

Zygaena sardoa, 1892*c* : cl. Holotype ♂: Sardinia. In M.N.P.

LIMACODIDAE

Dasychira colini, 1884 : 31. Holotype ♀: Africa: Das. colini Mab. Typ.: Ex musaeo P. Mabille 1923, Sénégal, 1 ♀ Holotypus. In Z.M.B.

Limacodes strigatus, 1879*b* : 139. Holotype ♂: Ex musaeo P. Mabille 1923: Ex coll. Oberthür: Limacodes strigatus P. Mab. Mad. [Madagascar]: Typus. In Z.M.B.

Macroplectra tripunctata, 1900 : 724. S. Africa. Not found.

Narosa castanea, 1900 : 724. Viette, 1954 : 382. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Parasa affinis, 1890*a* : 52. Viette, 1954 : 382. Holotype ♂: Madagascar (coll. Joannis). Paratype ♀: Same data. Both in M.N.P.

Parasa humilis, 1890*a* : 53. Viette, 1954 : 382. Lectotype ♂: Madagascar (coll. Joannis). In M.N.P.

Parnia cambouei, 1890*a* : 53. Viette, 1954 : 382. Holotype ♂: Madagascar (coll. Joannis). In M.N.P. (Espèce type du genre).

Thilptocnemis barbipes, 1900 : 724. Viette, 1954 : 382. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P. (Espèce type du genre).

THYRIDIDAE

Endagria locuples, 1879*b* : 134. Whalley, 1967: 16. Neotype ♂: Madagascar (centre), Ambatalaona, 10.xii.1932 (*Fountaine*), B.M. Slide 10102. In B.M. (N.H.).

Siculodes opalinula, 1880 : 347. Holotype ♀ (without abdomen): [Madagascar], Siculodes opalinula: Ex musaeo P. Mabille 1923: Ex. Oberthür Coll. Brit. Mus. 1927–3: Rhodoneura opalinula Mab. det J. D. Bradley 1952: type teste P. Viette. In B.M. (N.H.).

Siculodes terreola, 1880*d* : cviii. Madagascar. Not found.

PYRALIDAE

Actenia grandalis, 1908 : 67. Tunisia. Not found.

Alyta* [*sic*] *calligrammalis, 1879*b* : 143. Holotype ♂ (without abdomen): [Madagascar], Asopa comptalis P. Mab.: g. analyta Led. n. sp. voisine de l'albicillalis Led. ex Amboina: This specimen is the type of Analyta calligrammalis P. Mab. 1879. Bull. Soc. Philomathique P. Viette. In B.M. (N.H.).

Ambesa umbriferella, 1906 : 35. Holotype ♂: Alger [Algeria], 3. In M.N.P.

Bostra insignis, 1900 : 742. Viette, 1954 : 380. Lectotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Bostra zonalis, 1900 : 742. Viette, 1954 : 380. Lectotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Botys acosmialis, 1879*b* : 144. Holotype ♂: [Madagascar], Botys acosmialis P. Mb.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Botys bifenestralis, 1880*c* : xxv. Madagascar. Not found.

Botys chrysotalis, 1880*d* : cviii. Madagascar. Not found.

Botys holoxanthalis, 1881 : lxii. Madagascar. Not found.

Botys minutalis, 1880 : 339. Madagascar. Not found.

Botys monotretalis, 1880 : 339. see Noctuidae.

Botys stenopalis, 1880*c* : xxv. Madagascar. Not found.

Botys trigonalis, 1890 : 51. Without locality; ? W. Africa. Not found.

Botys venilialis, 1880*c* : xxv. Madagascar. Not found.

Cataclysta argyrochrysalis, 1900 : 743. Viette, 1954 : 380. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Chalcidoptera albotessulalis, 1900 : 744. Viette, 1954 : 380. Holotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Cataclysta callichromalis, 1879*a* : 94. Madagascar. Not found.

Crambidion achroellum, 1900 : 748. Viette, 1954 : 380. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P. (Espèce type du genre).

Crambus biradiellus, 1885 : 70. Holotype ♂: Archipel du Cap Horn, baie Orange (*Hyades & Hahn*). In M.N.P.

Crambus nigroradians, 1900 : 749. Comoro Is. Not found.

Crambus punctistrigellus, 1880*c* : xxvii. Viette, 1954 : 380. Holotype ♂: Madagascar (coll. Mabille). In M.N.P.

Ctenus malacellus, 1906 : 75, pl. 3 : 3. Holotype ♂: [Spain], Malaga. In M.N.P.

Dichocrocis tigridalis, 1900 : 745. Viette, 1954 : 380. Holotype (sans abdomen): Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Endotricha erythralis, 1900 : 742. Viette, 1954 : 380. Lectotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Entephria septemnotata, 1900 : 743. Viette, 1954 : 380. Lectotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Eudorea staudingeralis, 1869 : 58, pl. 2 : 6. Holotype ♂: Corse, Bastia. In M.N.P.

Euplocamus faedellus, 1880*c* : xxvi. Madagascar. Not found.

Euschraemon nigronaevalis, 1906 : 36, pl. 3 : 4. Holotype (without head and tip of abdomen): Alger [Algeria], 3. In M.N.P.

Euzophera pusilla, 1906: 35. Holotype ♀: Algeria: *Euzophera* sp. not in B.M. det. Hampson. In M.N.P.

Glyphodes desmialis, 1900 : 746. Without locality: Madagascar or Africa. Not found.

Glyphodes malgassalis, 1900 : 746. Madagascar. Not found.

Heterographis costalbella, 1906 : 34. Holotype ♀: Algérie, Chott Asloudj, 29.3. In M.N.P.

Heterographis rubroneurella, 1908 : 67. Holotype ♂: Tunisie, Kébili, 10.vi.1906 (*Daniel Lucas*. In M.N.P.

Heterographis thalerella, 1908 : 68. Holotype ♀: Tunisie, Nefta, mai 1904 (*Daniel Lucas*). In M.N.P.

Lygropia leucophanalis, 1900 : 746. Viette, 1954 : 381. Lectotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Margarodes septempunctalis, 1880*c* : xxv. Madagascar. Not found.

Metoecis lepidocerella, 1880 : 341. Viette, 1954 : 381. Lectotype ♂: Madagascar. In M.N.P. (Espèce type du genre).

Nacoleia dnopheralis, 1900 : 745. Viette, 1954 : 381. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Nymphula luteivittalis, 1880*c* : xxvi. Madagascar. Not found.

Pachyzancla atropunctalis, 1900 : 747. Viette, 1954 : 381. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Pachyzancla griseolineata, 1900 : 747. Viette, 1954 : 381. Holotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Paraponyx minoralis, 1881 : lxiii. Madagascar. Not found.

Perula asopialis, 1900 : 742. Viette, 1954 : 381. Lectotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P. (Espèce type du genre).

Phakellura imparivirgalis, 1881 : lxii. Madagascar. Not found.

Phakellura peridromella, 1881 : lxiii. Congo. Not found.

Phryganodes antongilensis, 1900 : 744. Viette, 1954 : 381. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Phycis (Myelois) saturatella, 1880*c* : xxvi. LECTOTYPE ♀: Madagascar. In M.N.P. Ce specimen, figuré par Ragnot (1893, pl. 22 : 15), a été trouvé dans le coll. Ragonot. Paralectotype ♂: Acrobasis saturatella Mab., Madag.: Ex musaeo P. Mabille 1923: Paravacini Coll. B.M. 1937–383. In B.M. (N.H.).

Pionea rufeolalis, 1900 : 747. Viette, 1954 : 381. Lectotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Pionea terminalis, 1880 : 338. Madagascar. Not found.

Platytes leucopleuralis, 1900 : 748. Viette, 1954 : 381. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Prorodes leucothyralis, 1900 : 746. Viette, 1954 : 381. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Pyralis cyanealis, 1879*b* : 143. Madagascar. Not found.

Pyrausta semilimbalis, 1900 : 748. Viette, 1954 : 381. Lectotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Rhodophaea semistrigella, 1908 : 68. Holotype ♂: Tunisie, Kébili, Zarcine, juin 1906: *Rhodophaea* sp. unnamed in the B.M. det. Hampson. In M.N.P.

Sindris leucotriangula, 1900 : 743. Viette, 1954 : 381. Lectotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Spilomela trivirgalis, 1880*d* : cviii. Madagascar. Not found.

Stenia baltealis, 1881 : lxii. Holotype ♂ (without head and abdomen): S. baltealis Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Stenia pulchellalis, 1880 : 337. Madagascar. Not found.

Stenia uniflexalis, 1880 : 336. Madagascar. Not found.

Sylepta hemichionalis, 1900 : 745. Viette, 1954 : 381. Lectotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Sylepta rubrifucalis, 1900 : 736. Viette, 1954 : 381. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Syngamia longicornalis, 1900 : 744. Viette, 1954 : 381. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Syngamia luteofusalis, 1900 : 744. Viette, 1944 : 381. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Ulopeza crocifrontalis, 1900 : 744. Viette, 1954 : 382. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Ulotricha lucasi, 1907*b* : 308. Holotype ♂: Tunisie, Kébili, mai 1906. In M.N.P.

DREPANIDAE

Drepana tetrathyra, 1900 : 724. Watson, 1965 : 132. Neotype ♂: [Madagascar], Diego Suarez, 8 March 1917 (*G. Melou*): Rothschild Bequest B.M. 1939–1: Photographed B.M. negative No. 31063. Drepanidae genitalia slide No. 608: *Crocinis tetrathyra* (Mabille), det. A. Watson 1963, Neotype. In B.M. (N.H.).

Nidara croceina, 1898 : 222. Watson, 1965 : 163. Lectotype ♀: [Madagascar]. Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

GEOMETRIDAE

Acidalia agrammaria, 1900 : 738. LECTOTYPE ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898): agrammaria Mb.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927.3: Geometridae genitalia slide No. 5174. In B.M. (N.H.).

Acidalia allardiata, 1869 : 59, pl. 2 : 7. Holotype ♂: [Corsica] 7. In coll. Herbulot.

Acidalia atromarginata, 1869 : 61, pl. 2 : 3. LECTOTYPE ♂: *A. atromarginata* Mb.: type: [Corsica] Bastia 7. In coll. Herbulot.

Acidalia cuspidata, 1900 : 738. Viette, 1954 : 382. Lectotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P. Paralectotype ♀ (without abdomen) with additional data; cuspidata Mab. Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Acidalia faeculentaria, 1880*c* : xxiii. LECTOTYPE ♀: Madag. [Madagascar]: Ac. faeculentaria Mb. Mad. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Acidalia holobapharia, 1900 : 739. LECTOTYPE ♂: Madagascar, Diego Suarez, 17. Ch. Alluaud, 1893: holobapharia Mab.: Ex. musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3: Geometridae genitalia slide No. 2784. In B.M. (N.H.).

Acidalia honestata, 1869 : 62, pl. 2 : 8. LECTOTYPE ♂: honestata Mb.: type: [Corsica], Bastia 1000 m. In coll. Herbulot.

Acidalia limbolata, 1900 : 738. Without locality. Not found.

Acidalia punctistriata, 1880*c* : xxiii. LECTOTYPE ♀: Acidalia punctistrigata [*sic*] Mab., Mad. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Paralectotype ♀: Similar data. Both in B.M. (N.H.).

Acidalia rubrosignaria, 1900 : 737. Viette, 1954 : 382. Lectotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Acidalia rufolutaria, 1900 : 739. Holotype ♂: Madag. [Madagascar], Loucoubé, *Ebenau*, 80 : 101: Acid. rufolotaria [*sic*] Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Acidalia sparsipunctata, 1900 : 738. Viette, 1954 : 382. Lectotype ♂ (sans abdomen): Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Acidalia spissilimbaria, 1888*a* : lix. Holotype ♂: spissilimbaria Mb. type: Alger [Algeria]. In coll. Herbulot.

Acidalia terrearia, 1900 : 739. Holotype ♀ (without abdomen and right-side wings): Madag. [Madagascar], Loucoubé, *Ebenau* 80: Ac. terrearia Mab.: Ex musaeo P. Mabille 1923: Ex. Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Amaurinia erythraria, 1893 : 62. Viette, 1954 : 382. Lectotype ♂: Madagascar (coll. Joannis). In M.N.P.

Anisodes landanata, 1898 : 227. Holotype ♀ (without abdomen): [Angola], Landana: Anisodes landanata Mab.: Anisodes landanata Mab. Landana: Anisodes landanata Mab. Landana, af. occ. [Afrique occidentale]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Aspilates citrinarius, 1885 : 67. Holotype ♂: Terre de Feu, baie orange (*Hyades & Hahn*). In M.N.P.

Aspilates glyphicarius, 1885 : 66. Holotype ♂: Terre de Feu, Ouchouaya (*Hyades & Hahn*). In M.N.P.

Boarmia antelmaria, 1893 : 64. LECTOTYPE ♂ (without head and abdomen): Maurice: Boarmia anthelmaria [*sic*] Mab., Ile Maurice: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Boarmia atrilunaria, 1893 : 63. LECTOTYPE ♀: Maurice: B. atrilunaria Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Paralectotype ♀: Maurice: Boarmia atrilunaria Mab. paratype [det. L. B. Prout]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Both in B.M. (N.H.).

Boarmia basilaria, 1890 : 47. Holotype ♂: Boarmia basiliaria Mab. afr. oc. [afrique occidentale]: Boarmia basilaria Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Boarmia buxicolaria, 1873 : 490, pl. 15: 1, 2. LECTOTYPE ♂: buxicolaria Mb.: type: [France]. Aude 8. In coll. Herbulot.

Bormia [*sic*] ***monogrammaria***, 1890 : 48. Holotype ♀: Zanbar [Zanquebar, historically E. African seaboard]: Boarmia monogramaria [*sic*] Mab.: Boarmia monogrammaria Mab. afric.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Geometridae genitalia slide No. 1784. In B.M. (N.H.).

Boarmia obsitaria, 1890 : 47. Fletcher, 1967 : 91. Lectotype ♂: [Angola], Landana: Boarmia obsitaria Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3: Geometridae genitalia slide No. 2135. Paralectotype ♂: [Angola], Landana, mars-av.: Boarmia obsitaria Mab. Congo: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Both in B.M. (N.H.).

Boarmia subocularia, 1893 : 64. Holotype ♂ (without abdomen): afr. oc. [afrique occidentale]: B. subocularia Mab.: 237: Boarmia subocularia Mab. afr. occ. [afrique occidentale]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Caberodes hemigrammata, 1898 : 227. Holotype ♂: Comores: not in B.M. [det. Hampson]: Caberodes hemigrammata Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3: Genitalia preparation No. 1932–15. In B.M. (N.H.).

Caberodes insularia, 1880*c* : xxii. Holotype ♀: Caberodes, Metrocampa insularia Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Caberodes russulata, 1898 : 226. Holotype ♂: Comores: Unnamed in B.M. [det. Hampson]: Caberodes: Caberodes russata [*sic*] Mab. Comores: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Camptogramma monacmaria, 1898 : 229. Holotype ♂ (without body): Ouest afr. [Ouest afrique]: Cid. monacmaria Mab. Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Figured in Seitz, Vol. xii. In B.M. (N.H.). True locality probably Australia: see L. B. Prout, 1939, *in* Seitz, Macrolepidoptera of the World, 12 : 242.

Camptogramma polyacmaria, 1898 : 230. LECTOTYPE ♂ (without abdomen): [Comoro Is.] Mayotte: C. polygrammaria [*sic*] Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M.(N.H.).

Cidaria ectypata, 1888*a* : lviii. Holotype ♀: Cidaria ectypata: [Tunisia] Gabés 16/8/8(?). In coll. Herbulot.

Cidaria mutabilis, 1885 : 69. Holotype ♂: Terre de Feu, baie orange (*Hyades & Hahn*). In M.N.P.

Cidaria nanula, 1900 : 737. Viette, 1954 : 382. Holotype ♀: Madagascar, Maevatanana (*J. Decorse*). In M.N.P.

Cidaria perornata, 1885 : 69. Holotype ♀: Terre de Feu, canal du Beagle (*Hyades & Hahn*). In M.N.P.

Crocinis atricostaria, 1898 : 229. Viette, 1954 : 382. Holotype ♂: Madagascar (coll. Joannis). In M.N.P.

Diptychia rhodotenia, 1898 : 226. Whalley, 1964 : 119. Madagascar. Not found.

Ellopia dumonti, 1906 : 32, pl. 3 : 2. Holotype ♂: Espagne, La Granja, 6.viii.01 (*C. Dumont*). In M.N.P. Figured by Culot, 1922, Geometrides d'Europe, pl. 47 : 966.

Endropia convexaria, 1890 : 48. LECTOTYPE ♂: [Angola] Landana: End. convexaria: Endropia convexaria Mab. Congo: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3: Geometridae genitalia Slide No. 1578. Paralectotype ♂: Landana mars-av.: Endropia convexaria Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Both in B.M. (N.H.).

Endropia polychroaria, 1890 : 48. LECTOTYPE ♂: [Angola] Landana mars-av.: Endropia polychroaria Mab.: Endropia polychroaria Mab. Congo: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3: Geometridae genitalia slide No. 1542. Paralectotype ♂: Landana: Endropia polychromaria [*sic*] Mab. Landana: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Both in B.M. (N.H.).

Ennomos hyadesii, 1885 : 65. Holotype ♀ (without abdomen): Terre de Feu, baie orange (*Hyades & Hahn*). In M.N.P.

Epione malefidaria, 1880*c* : xxii. LECTOTYPE ♂: [Madagascar] Apicia malefidaria Mab.: Type: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M.(N.H.).

Erosia sigillata, 1898 : 228. Viette, 1954 : 382. Holotype ♀: Madagascar (coll. Joannis). In M.N.P.

Eubolia obvallaria, 1867 : 561, pl. 8 : 8. LECTOTYPE ♂: [Corsica]. Rotundo. 7. obvallaria P.M. In coll. Herbulot.

Eucrostis albicornaria, 1880*a* : clv. LECTOTYPE ♀: Madag. [Madagascar]: Eucrostis albicornaria Mab.: Madagascar albicornaria Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Eucrostis lilliputaria, 1900 : 741. Viette, 1954 : 382. Holotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Eucrostis nudilimbaria, 1880*a* : clv. Holotype ♂: Corse, nudilimbaria Mb. In coll. Herbulot.

Eucrostis rufocellata, 1900 : 741. Viette, 1954 : 383. Holotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Eucrostis rufostellata, 1898 : 740. Madagascar. Not found.

Eupithecia achilleata, 1869 : 70, pl. 2 : 5. LECTOTYPE ♀: [Corsica] achilleata Mb.: type. In coll. Herbulot.

Eupithecia chloerata, 1870 : 96. France. Not found.

Eupithecia cocciferata Millière, var. ***semitinctaria***, 1868 : 651, pl. 14 : 2. Corsica. Several syntypes in coll. Herbulot 'but none quite corresponding with description' (Herbulot in litt.).

Eupithecia goossensiata, 1869 : 78. LECTOTYPE ♀: [France] goossensiata Mab.: Type. In coll. Herbulot.

Eupithecia hemileucaria, 1880*c* : xxiv. Madagascar. Not found.

Eupithecia innotata f. [ssp.] ***meridionalis***, 1869 : 73. Corsica and S. France. Not found.

Eupithecia lentiscata, 1869 : 75. Holotype ♂: lentiscata Mb.: Corse. In coll. Herbulot.

Eupithecia nepetata, 1869 : 68, pl. 2 : 4. LECTOTYPE ♀: nepetata: type: [Corsica], Bastia. In coll. Herbulot.

Eupithecia pyrenaeata, 1871 : 168. LECTOTYPE ♀: [France, Pyrenees] pyrenaeata Mb. type. In coll. Herbulot.

Eupithecia santolinata, 1871 : 168. Holotype ♀: santolinata Mab.: [France], Carcasson. 7. In coll. Herbulot.

Eupithecia silenicolata, 1867 : 562, pl. 8 : 9a, 9b. LECTOTYPE ♀: silenicolata Mab.: type: [Corsica], Bastia. In coll. Herbulot.

Eupithecia unedonata, 1868 : 649, pl. 14 : 3a, 3b, 3c. Corsica. Not found.

Feronia zerenaria, 1879*a* : 92. LECTOTYPE ♂: [Angola], Landana: Nolera zerenaria Mb. Congo: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Paralectotype ♂: Nolera zerenaria Mab.: af. occ. [afrique occidentale]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Both in B.M. (N.H.).

Gynopteryx rubedinaria, 1890 : 46. W. Africa. Not found.

Hemerophila mauritiaria, 1893 : 62. Viette, 1954 : 383. Lectotype ♂: I. Maurice (coll. Thierry-Mieg). In M.N.P.

Hemithea dentata, 1900 : 740. Without locality; Madagascar or Africa. Not found.

Heterolocha indiscretaria, 1898 : 227. Viette, 1954 : 383. Holotype ♂: Madagascar (coll. Joannis). In M.N.P.

Hibernia marginaria Borkhausen ab. ***lesaunieri***, 1916 : 141. Holotype ♀: [France] Hyb. marginaria V. ♀ Lesaunieri Mab. In coll. Herbulot (ex coll. Lesaunier in coll. Lhomme).

Hippoplectis disticlaria, 1885 : 67. Holotype ♂: Terre de Feu, Ouchouaya (*Hyades & Hahn*). In M.N.P.

Hylemera fadella see Arctiidae.

Hylemera luteipes, 1890 : 38. Without locality. ? W. Africa. Not found.

Hyperythra miegii, 1882*a* : 135. LECTOTYPE ♂: Madagascar: hyperythra miegii Mab. (le natur. 1882, p. 135), Madagascar, type original: Dognin Collection. In U.S.N.M.

Hypochroma eugrapharia, 1880 : 347. Holotype ♀: Madag. [Madagascar]: Hypochroma eugrapharia. P. Mb.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Hypochroma signifrontaria, 1893 : 65. Holotype ♂: [Comoro Is.] Mayotte: Hyp. signifrontaria Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Larentia multivirgulata, 1885 : 70. Holotype ♂: Terre de Feu, baie orange (*Hyades & Hahn*). In M.N.P.

Larentia semilotaria, 1885 : 70. Holotype ♂ (without abdomen): Terre de Feu, baie orange (*Hyades & Hahn*). In M.N.P.

Leucochesias mesargyrata, 1889 : 158, pl. 2 : 4. Holotype ♂: Santa Cruz, Patagonie (*Lebrun*). In M.N.P.

Liodes homochromata, 1869 : 57, pl. 2 : 9. Holotype ♂: Liodes homochromata M.: [Corsica], Bastia 6 (or 5). In coll. Herbulot.

Lithostege fissurata, 1888*a* : lviii. Holotype ♀: [Tunisia], Lithostege fissurata; type. In coll. Herbulot.

Lobophora oculata, 1885 : 68. Holotype ♀: Terre de Feu, baie orange (*Hyades & Hahn*). In M.N.P.

Lobophora stenopterata, 1885 : 68. Holotype ♂ (without abdomen): Terre de Feu, baie orange (*Hyades & Hahn*). In M.N.P.

Macaria albogrisearia, 1900 : 736. Viette, 1954 : 383. Lectotype ♂: Madagascar, Maevatanana (*J. Decorse*). In M.N.P.

Macaria cataleucaria, 1898 : 229. [Mozambique], Delagoa, Zanquebar [historically E. African seaboard]. Not found.

Macaria crasselimbaria, 1880*c* : xxiii. Madagascar. Not found.

Metrocampa ferruginaria, 1898 : 231. Holotype ♀: Met. ferruginaria Mab. Comores: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Geometridae genitalia slide No. 2500. In B.M.(N.H.).

Metrocampa punctuligera, 1879*a* : 91. Holotype ♂ (without head and mended with ♀ abdomen): Metrocampa punctuligera P. Mab. [Angola] Landana: Metrocampa punctuligera Mab. Congo: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Metrocampa venerata, 1879*a* : 91. Holotype ♀ (without abdomen): [Angola] Landana mars-av.: Metrocampa venerata P.M. Congo: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Nemoria aequaria, 1898 : 231. LECTOTYPE ♀: Madagascar: N. aequaria Mab. Mad. Comor.: C. aequaria Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Geometridae genitalia slide No. 982. In B.M. (N.H.).

Nemoria chlorinaria, 1898 : 230. Viette, 1954 : 383. Lectotype ♂: Madagascar (coll. Joannis). In M.N.P.

Nemoria pallidularia, 1880 : 333. Madagascar. Not found.

Nemoria viridellaria, 1898 : 231. Holotype ♀: Maurice: Nemor. viridellaria Mab. maurit. isl.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Nolera melanthiata, 1891*b* : cxxvii. Gabon. Not found.

Orgyia aurantia, 1880 : 345 (now *Pseudocrocinis*, **comb. n.**). Holotype ♂: [Madagascar] Orgyia aurantia P. Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Orsonoba trivittata, 1900 : 737. Viette, 1954 : 383. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Phorodesma leucochloraria, 1880*c* : xxii. LECTOTYPE ♀: [Madagascar] Phor. leucochloraria Mb.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Paralectotype ♀: Geometra Phorodesma leucochloraria Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Both in B.M. (N.H.)

Phorodesma hemistrigata, 1900 : 740. Viette, 1954 : 383. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Psamatodes arenularia, 1880*c* : xxiv. Madagascar. Not found.

Psodos quadrisectaria, 1885 : 68. Holotype ♀: Terre de Feu, baie orange (*Hyades & Hahn*). In M.N.P.

Salpis albipunctaria, 1885 : 66. Holotype ♂: Santa Cruz, Patagonie (*Lebrun*). In M.N.P.

Salpis antennata, 1885 : 65. Holotype ♂: [Terre de Feu], Canal du Beagle, Ouchouaya (*Hyades & Hahn*). In M.N.P.

Salpis scodionata, 1885 : 66. Holotype ♂: Santa Cruz, Patagonie (*Lebrun*). In M.N.P.

Scotosia syngrammata see Noctuidae.

Selidosema oliveirata, 1876 : cix. LECTOTYPE ♂: S. oliveirata Mb.: type: [Portugal] Coimbra. In coll. Herbulot.

Stegania luteorubens, 1900 : 737. Viette, 1954 : 383. Lectotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Stegania ruberata, 1900 : 736. Viette, 1954 : 383. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Synneuria virgellata, 1885 : 68. Holotype ♂: Santa Cruz, Patagonie (*Lebrun*). In M.N.P.

Tephrina binaevata, 1869 : 56, pl. 2 : 1, 2. LECTOTYPE ♂: [Corsica], Halia binaevata Mb. In coll. Herbulot.

Tephrina inaequivirgaria, 1890 : 49. LECTOTYPE ♀: En mer—Côtes du Sénégal 14.vii.: Tephrina inaequivirgaria Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Paralectotype ♀: Similar data. Both in B.M. (N.H.).

Tephrina malesignaria, 1880*c* : xxiii. Madagascar. Not found.

Tephrina subcurvaria, 1898 : 228. Holotype ♀: Ouest af. [Ouest afrique]: T. subcurvaria Mb.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Tephrina univirgaria, 1880*c* : xxiv. Madagascar. Not found.

Tephrosia griseoalbata, 1893 : 63. Viette, 1954 : 383. Holotype ♂: Madagascar (coll. Joannis). In M.N.P.

Thalassodes pallidulata, 1880*c* : xxi. Madagascar. Not found.

Thalassodes subreticulata, 1900 : 740. Madagascar. Not found.

Thalera atroviridaria, 1880*c* : xxii. Madagascar. Not found.

Triphosa directaria, 1889 : 157, pl. 2 : 7. Holotype ♂: Santa Cruz, Patagonie (*Lebrun*). In M.N.P.

Zamarada crystallophana, 1900 : 741. Holotype ♀ (without abdomen): [W. Africa] *Zamarada crystallophana* Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Zerene tricoloraria, 1890 : 50. Holotype ♂ (without head): Zeren, tricoloraria Mab. Zanbueb. [Zanquebar, historically E. African sea-board]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

URANIIDAE

Micronia albidiorata, 1893 : 62. Holotype ♂: afr. occ. [afrique occidentale]: 239: Micr. albidiorata Mab. afr. occ.: Micronia albidiorata Mab. Congo: Ex musaeo P. Mabille 1923: Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Micronia fasciata, 1879*a* : 92. LECTOTYPE ♀: M. fasciata P. Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Micronia malgassaria, 1879*a* : 92. Holotype ♀ (without abdomen): Madag. [Madagascar]; Madagascar: Micronia malgassaria Mab.: Micronia malgassaria P. Mb. Madagascar: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Micronia semifasciata, 1880 : 335. Madagascar. Not found.

PTEROTHYSANIDAE

Caloschemia monilifera, 1879*a* : 86. Holotype ♂: Madagascar, de St. Augustin à Tuléar (*A. Grandidier*). In M.N.P.

LASIOCAMPIDAE

Anchirithra punctuligera see Lymantriidae.

Bombix [*sic*] **bilineata**, 1884 : 31. Senegambia. Not found.

Bombyx datini, 1888*a* : xlii. Tunisia. Not found.

Bombyx hyadesi see Saturniidae.

Bombyx sordida, 1879*b* : 138. Madagascar. Not found.

Bombix [*sic*] **subulva**, 1884 : 31. Senegambia. Not found.

Borocera pelias, 1879*b* : 138. LECTOTYPE ♂: Mad. [Madagascar]: pelias Bd. Mad.: Ex musaeo Drs. Boisduval: Borocera Pelias Mab.—Conte ♂ Lep. prod. soie, 6 fasc., Pl. XIII, fig. 7. In B.M. (N.H.).

Borocera punctifera, 1880*c* : xvii. Holotype ♀: [Madagascar] Borocera punctifera Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Closterothrix gambeyi, 1879*a* : 91. Holotype ♀: [Madagascar] closterothrix gambeyi P. Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Gonometa argibasis, 1893 : 59. Holotype ♀: Mozamb. [Mozambique]: gonometa? argibas Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Lasiocampa gueneana, 1880 : 314. Madagascar. Not found.

Lasiocampa plagiogramma, 1880 : 314. LECTOTYPE ♂: Madagascar: près de l'otus: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Genitalia preparation 1952–201. Paralectotype ♀: Las. plagiogramma ♀ Madag.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Both in B.M. (N.H.).

Pachypasa directa, 1893 : 58. Holotype ♀: Pachypasa directa Mab.: Dewitz Chinchoua [Gabon]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3: Genitalia preparation 1936–24. In B.M. (N.H.).

SATURNIIDAE

Antheraea laestrygon, 1878 : clxxx. Holotype ♀: Antheraea loestrygon [*sic*] februar: [Angola] Landana, Congo: Antheraea loestrygonia [*sic*] Congo: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Bombyx hyadesi, 1885 : 58. Holotype ♂: Terre de Feu, Onchomaya (*Hyades et Hahn*). In M.N.P.

Perisomena cincta, 1880 : 317. Holotype ♂: Cincta Bd., Goud., Madag. [Madagascar]: Ex Musaeo Dris. Boisduval: Coll. Ch. Oberthür: Rothschild Bequest B.M. 1939–1. In B.M. (N.H.).

Saturnia (Bunaea) auricolor, 1879*b* : 139. Madagascar. Not found.

Saturnia diospyri, 1880 : 316. Holotype ♂: Madagascar (coll. Boisduval—Coll. Ch. Oberthür). In M.N.P.

Saturnia (Bunaea) fusicolor, 1879*b* : 139. Madagascar. Not found.

SPHINGIDAE

Ambulyx grandidieri, 1879*b* : 135. Holotype ♂: Madagascar (*Grandidier*). In M.N.P.

Basiana stigmatica, 1877 : 491. Holotype ♀: Basiana stigmatica P. Mab., Congo: Brachyglossa stigmatica Mb. Congo: Ex musaeo P. Mabille 1923: 9445. In C.M.P.

Chaerocampa argyropeza, 1879*b* : 135. Holotype ♀: argyropeza P. Mb. Madagasc. [Madagascar]: Ocyton tyrrhus Bdv. argyropeza Mab.: Ex musaeo P. Mabille 1923: 9859. In C.M.P.

Chaerocampa bifasciata, 1880 : 345. [Madagascar]. 'There is no specimen marked type, and B.P. Clark's notes list this as one of the species whose type was not received from Oberthür. However, I think it merely a case of the type having been overlooked because it was not (as were none of Mabille's) marked as a type. The following specimen is almost certainly the type. It is a female, fresh but with the body badly dermestid-eaten. It bears the following labels:

(1) Gnath.
laticornis Btl.
(penned)

(2) Gnathostypris
laticornis Btl.
(penned)

(3) 10156
(printed)

(4) Clark
Collection
Acc. 12720
(printed)

(5) Ex musaeo
P. Mabille
1923
(printed)

(6) Basiothia laticornis
Butler
(penned, B. P. Clark)

What probably happened is that Mabille discovered the synonymy and merely removed his labels and substituted identification lables 'as corrected'. It is the only Mabille collection specimen in the series and its condition and appearance accord fully with the other Mabille specimens, of other species.' Dr. H. K. Clench, Carnegie Museum, Pittsburgh ***in litt.*** 19.iii. 1957.

Macroglossa aesalon, 1879*c* : 299. Holotype ♂ (without head: body badly dermestid-eaten): Macroglossa Aesalon P. Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923. 6066. In C.M.P.

Macroglossa bombus, 1880 : 347. Holotype ♀: Madagascar: M. bombus Mab. Sta mario: Macroglossa Bombus P. Mb. Madag.: 9919. In C.M.P.

Pterogon obscurus, 1880 : 344. Holotype ♂: [Madagascar], Pterogon obscurus Mab.: Pterogon obscurus Mab.: Ex musaeo P. Mabille 1923: 9884. In C.M.P.

Sphinx oegrapha, 1884*a* : clxxxvii. Holotype ♂: Madag. [Madagascar]: sp. agrapha Mab.: Ex musaeo P. Mabille 1923. 9644. In C.M.P.

NOTODONTIDAE

Coenostegia barrei, 1891 : cxlvii. Viette, 1954 : 383. Lectotype ♀: Madagascar (coll. Joannis). In M.N.P.

Coenostegia flavens, 1891 : cxlvii. LECTOTYPE ♂: Menabé: Coenostegia flavens Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. 1927–3. In B.M. (N.H.).

Ichthyura spissicornis, 1900 : 723. Viette, 1954 : 383. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Notodonta angustipennis, 1881 : lvi. Madagascar. Not found.

Notodonta brunneomixta, 1898 : 221. Holotype ♀: afr. cent. [afrique centrale]: Not in B.M. Notodont. Harpyia brunneomixta Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Notodonta marmor see Lymantriidae.

Phalera lignitea, 1900 : 723. S. Africa. Not found.

Stauropus subnigrans, 1898 : 221. E. Africa. Not found.

LYMANTRIIDAE

Anchirithra punctuligera, 1880 : 315. (Now *Psalis*, see Collenette 1955 : 171). Holotype ♂: [Madagascar]: Anchirithra punctuligera P. Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Arctia (Areas) galactina, 1880*d* : cvii. (Now *Dasychira* see Collenette, 1955 : 171). Holotype ♂: Spilosoma areas galactina Mb. Madag. [Madagascar]: Dasychira: areas galactina Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Areas colini, 1893 : 58. Viette, 1954 : 383. (Now *Dasychira*: see Collenette, 1955 : 171). Holotype ♀: Madagascar (coll. Joannis). In M.N.P.

Cypra argenna, 1900 : 725. Viette, 1954 : 383. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Dasychira colini see Limacodidae.

Dasychira fidjiensis Mabille & Vuillot, 1890 : 5, pl. 1 : 2. Holotype ♂: Fidji Ins.: Dasychira fidjiensis Mab. et Vuill. ♂ Type Fidji: Rothschild Bequest B.M. 1939–1. In B.M. (N.H.).

Dasychira ochroderoea, 1898 : 223. Holotype ♀: Madagascar, Diego Suarez, 1893 (*Ch. Alluard*): D. ochroderoea Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Dasychira phaeosericea, 1884*a* : clxxxix. Holotype ♀ (without abdomen): Madag. [Madagascar]: Dasychira phaeosericea Mab.: Das phaeosericea Mab. Mad. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Dasychira platyptera, 1885 : 58. Magellan Is. Not found.

Dasychira suarezia, 1898 : 222. Holotype ♂: Madagascar. Diego-Suarez, 7.1893 (*Ch. Alluaud*): Dasychira not in B.M.: Dasych. suarezia Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Hylemera fadella see Arctiidae.

Hylemera luteipes see Geometridae.

Laelia diaphanella, 1898 : 223. Holotype ♀ (without head and abdomen): Madag. [Madagascar]: Leucoma diaphanella Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Laelia leucolepis, 1898 : 223. Central Africa. Not found.

Liparis barica, 1879*a* : 90. Viette, 1954 : 384. Lectotype ♂: Madagascar, de Saint-Augustin à Tuléar (*A. Grandidier*, 1867). In M.N.P.

Liparis binotata, 1880*d* : cvii. Holotype ♀: Madag. [Madagascar]: Liparis binotata P. Mab.: Liparis binotata P. Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Liparis heptasticta, 1879*a* : 90. Holotype ♂: Lip. hexasticta [*sic*] Mab.: L. heptasticta Mb. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Liparis melanocera, 1879*a* : 89. Holotype ♂ (without abdomen): Laelia melanocera Mab. Madag. [Madagascar]: Leucoma melanocera P. Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Liparis nolana, 1882*a* : 134. Madagascar. Not found.

Liparis rhodophora see Noctuidae.

Liparis vitrina, 1879*a* : 90. Holotype ♀ (without abdomen): [Madagascar], Liparis vitrina P. Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Lymantria rufofusca, 1900 : 725. Viette, 1954 : 384. Holotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Notodonta marmor**,** 1880*c* : xvii. (Now *Dasychira*; see Collenette, 1955 : 171 as *marmorina*). Holotype ♀: Mad. [Madagascar]: Notodonta marmorina [*sic*] (Clostera) Mab.: Notodonta marmorina [*sic*] Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Orgyia aurantia see Geometridae.

Orgya [*sic*] ***ramburii*****,** 1867 : 557, pl. 8 : 6. LECTOTYPE ♂: Corse. In M.N.P.

Orgyia (Dasychira) velutina**,** 1879*a* : 90. Holotype ♂: [Madagascar]: D. velutina Mb. liparis sp.: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Porthesia depauperata**,** 1880*c* : xvii. LECTOTYPE ♀ (without abdomen): Madag. [Madagascar]: Porthesia depauperata Mab. Madag.: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

ARCTIIDAE

Amblythyris radama**,** 1879*b* : 137. LECTOTYPE ♀: Rhadama Bd. Madagascar: Ex musaeo Dris. Boisduval: Mad. [Madagascar]: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Arctia bicolor see Noctuidae.

Arctia (Areas) galactina see Lymantriidae.

Bizone grandis**,** 1879*b* : 136. Madagascar. Not found.

Deiopea [*sic*] ***diva*****,** 1880 : 305. Madagascar. Not found.

Dejopeia [*sic*] ***heterochroa*** see Hypsidae.

Deiopeja [*sic*] ***serrata*****,** 1879 : 21. Madagascar. Not found.

Eugoa pluripunctata**,** 1900 : 725. Viette, 1954 : 386. Holotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Hylemera fadella**,** 1882 : 100. Madagascar. Not found.

Lithosia amaurobapha**,** 1900 : 725. Viette, 1954 : 386. Holotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Lithosia bijuga**,** 1899*a* : 270. Viette, 1954 : 386. Holotype ♀: Madagascar (coll. Joannis). In M.N.P.

Lithosia catenata**,** 1900 : 726. Viette, 1954 : 386. Holotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Lithosia cirrochroa**,** 1900 : 726. Madagascar. Not found.

Lithosia cocciniceps**,** 1884*a* : clxxxix. Madagascar. Not found.

Lithosia (Paedia) costimacula**,** 1879*a* : 87. Congo. Not found.

Lithosia erythropleura**,** 1879*c* : 302. Holotype ♂: Typicum Specimen: Madagascar: Lith. erythropleura Mab.: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Lithosia flammea**,** 1885 : 57. Madagascar. Not found.

Lithosia imitans**,** 1879*a* : 87. Birket-Smith, 1965 : 99. Neotype ♀: Angola (*Dr. K. Jordan*): Fazenda Congulu, Amboim district, 7–800 m., 17–22.iv.1934. Rothschild Bequest Brit. Mus. 1939–1. Lithosia imitans Mabille, neotype ♀, J. Birket-Smith sel. 1965. In B.M. (N.H.).

Lithosia mauritia**,** 1899 : 220. LECTOTYPE ♀: L. mauritia Mab., Maurice: Mauritius 99–34 [Presented to B.M. (N.H.) by P. Mabille, 1899]. In B.M. (N.H.).

Lithosia pallidicosta**,** 1900 : 726. Viette, 1954 : 387. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Lithosia sanguinolenta**,** 1879*a* : 87. Madagascar. Not found.

Lithosia simulans, 1879*a* : 87. Birket-Smith, 1965 : 101. Neotype ♂: Angola (*Dr. K. Jordan*): Fazenda Congulu, Amboim district, 7–800 m., 7–11.iv.1934: Arctiidae genitalia slide No. 601: Rothschild Bequest Brit. Mus. 1939–1: Lithosia simulans Mabille. Neotype ♂, J. Birkett-Smith sel. 1965. In B.M. (N.H.).

Lithosia subrosea, 1898 : 220. Madagascar. Not found.

Lithosia umbrigera, 1900 : 726. Viette, 1954 : 387. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Megacraspedum quinquepunctatum, 1900 : 727. Without locality; Madagascar or Africa. Not found.

Miltochrista ochrorubens, 1900 : 726. Viette, 1954 : 387. Holotype ♂ (sans abdomen): Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Nudaria m-nigrum, 1899*a* : 270. Viette, 1954 : 387. Holotype ♀: Madagascar (coll. Joannis). In M.N.P.

Phryganopsis plumosa, 1900 : 726. Viette, 1954 : 387. Holotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Spilosoma aspersa, 1879*a* : 89. LECTOTYPE ♀: Madag. [Madagascar]: Spil. aspersa: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Spilosoma melanimon, 1880*c* : xvi. Holotype ♀ (not ♂): [Madagascar]. Arctia melanimon Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M.(N.H.).

Spilosoma robleti, 1893 : 57. Viette, 1954 : 387. Lectotype ♂: Madagascar (coll. Joannis). In M.N.P.

SYNTOMIDAE

Aglaope ? perpusilla, 1880 : 348. Oberthür, 1925 : 67, pl. 592 : 5030. Griveaud, 1964 : 56, pl. 1 : 31. Holotype ♂: Madag. [Madagascar]: Aglaope perpusilla Mab.: Micronaclia simplex Btl.? perpuslila Mab.: Ex musaeo P. Mabille 1923: figuré dans le volume 22, 2^{e} partie: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Glaucopis iridea see Zygaenidae.

Glaucopis pelidne see Zygaenidae.

Naclia ? erythrogaster see Zygaenidae.

Naclia quadrimacula, 1879*a* : 85. Oberthür, 1893 : 2. Griveaud, 1964 : 84, pl. 1 : 53. Holotype ♂: Quadrimacula B. Madag. [Madagascar]: Ex Musaeo Dris. Boisduval: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Naclia tenera, 1879*a* : 85. Griveaud, 1964 : 43, pl. 1 : 19. Holotype ♂ (without abdomen): Tenera B. Madag. [Madagascar]: Ex musaeo Dris. Boisduval: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Naclia trimacula, 1879*a* : 85. Oberthür, 1893 : 4. Griveaud, 1964 : 84, pl. 1 : 53. Holotype ♂: Trimacula B. Madag. [Madagascar]: Ex Musaeo Dris. Boisduval: Ex. Oberthür Coll. Brit. Mus. 1927–3: Syntomidae genitalia slide No. 55. In B.M. (N.H.).

Naclia tristigma, 1893 : 58. Mabille & Vuillot, 1895 : 148, pl. 21 : 2. Holotype ♀: Sierra Leone, 87–88, *Preuss*. In Z.M.B.

Syntomis anapera, 1879*a* : 85. Griveaud, 1964 : 30. Lectotype ♀: anapera Mab. Mad. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Syntomidae genitalia slide No. 49. In B.M. (N.H.).

Syntomis butleri, 1882*a* : 134. Viette, 1954 : 387. Lectotype ♀: Madagascar (coll. Thierry-Mieg). In M.N.P.

Syntomis culiculina see Zygaenidae.

Syntomis curtiplaga, 1890 : 35. Holotype ♂: curtiplaga Mb. Congo: curtiplaga P. Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Syntomis interniplaga, 1890 : 35. LECTOTYPE ♀: S. interniplaga Mab. Congo: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Paralectotype ♀: Syntomis interniplaga Mab. Congo: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Both in B.M. (N.H.).

Syntomis muscella, 1884*a* : clxxxviii. Griveaud, 1964 : 34, pl. 1 : 11. Holotype ♀: Micronaclia muscella Mb. Madag. [Madagascar]: Ex musaeo P. Mabille 1923 : Ex Oberthür Coll. Brit. Mus. 1927–3: Syntomidae genitalia slide No. 43. In B.M. (N.H.).

Syntomis parvipuncta see Zygaenidae.

Synthomis [*sic*] ***pterophorina***, 1892 : cxxxix. Mabille & Vuillot, 1895 : 152, pl. 21 : 7. Holotype ♂: Verulam, Natal, *Spiller*. In Z.M.B.

Syntomis quinquemacula, 1882 : 134. Griveaud, 1964 : 112, pl. 1 : 76, 77. Lectotype ♀: 5 macula Mab. Mad. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Syntomis reducta, 1879*a* : 84. Griveaud, 1964 : 26, pl. 1 : 6. Holotype ♂: Reducta B. Madag. [Madagascar]: Ex musaeo Dris. Boisduval: Ex Oberthür Coll. Brit. Mus. 1927–3: Syntomidae genitalia slide No. 50. In B.M. (N.H.).

Syntomis rubicunda, 1892*b* : cxxxix. Mabille & Vuillot, 1895 : 153, pl. 21 : 8. LECTOTYPE ♀: Kamerun int., Barombi Station, 1889 (*Preuss*): Origin: Coll. Staudinger : Type: Syntomis rubicunda Mab. In Z.M.B.

Syntomis zygaenoides, 1884 : clxxxviii. Griveaud, 1964 : 26. Lectotype ♂: [Madagascar]. Zygaenoides Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3: Syntomidae genitalia slide No. 60. In B.M. (N.H.).

Thyretes melinos, 1890 : 37. Holotype ♀: Thyr. melinos Mb. [Ivory Coast], Assinie: Metarctia invaria Wlk. [Hampson det.]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3: Syntomidae genitalia slide No. 81. In B.M. (N.H.).

HYPSIDAE

Aganais mecynoides, 1879*c* : 295, pl. 6 : 3. Madagascar. Not found.

Callimorpha incomparabilis, 1892 : clxxiv. Holotype ♀: Call. incomparabilis Mab. Guinea sept.: C. incomparabilis Mab. Cote occ. Afric. [Côte occidentale Afrique]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Chelonia rubriceps, 1879*a* : 88. LECTOTYPE ♀: Caryatis rubriceps Mab. Mad. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Dejopeia [*sic*] ***heterochroa***, 1879*a* : 88 (Now *Callicereon*, **comb. n.**). LECTOTYPE ♀ (without abdomen): [Madagascar], Callimorpha heterochroa: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Euchelia ragonoti, 1880 : 348. Holotype ♀ (not ♂ as recorded): [Madagascar], Euchelia ragonoti Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3: Genitalia preparation 1956–779. In B.M. (N.H.).

Eusemia vectigera, 1882 : 100. Holotype ♂: [Madagascar], Ag. vectigera Mab.: Lymantriidae. Fodinoidea maculata Butl. Ex D. Hampson = A. vectigera Mb.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Hypsa ambusta see Agaristidae.

Hypsa chionea, 1879*a* : 86. Congo. Not found.

Hypsa concinnula see Noctuidae.

Nichthemera [*sic*] ***biformis*****,** 1879*a* : 87. LECTOTYPE ♂: Leptosoma biformis P.M. ♂: Nychthemera [*sic*] Mabillei Butl. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Nichthemera biformis ♂ Mab. Soc. Zool. Franc. vol. III—1879, p. 87: Ex Oberthür Coll. Brit. Mus. 1927–3. Paralectotype ♀: L. biformis Mab.: Nychthemera [*sic*] biformis Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923. Ex Oberthür Coll. Brit. Mus. 1927–3. Both in B.M. (N.H.).

Nychthemera [*sic*] ***rasana*****,** 1879*c* : 304. LECTOTYPE ♀: Madagascar: N. rasana Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

NOLIDAE

Celama geminata**,** 1900 : 727. Viette, 1954 : 386. Holotype ♂ (sans tête et abdomen): Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Nola picturata**,** 1899*a* : 270. Viette, 1954 : 387. Holotype ♀: Madagascar (coll. Joannis). In M.N.P.

NOCTUIDAE

Acantholipes angulina**,** 1881 : lxi. Holotype ♂: [Angola], Congo, Landana. In M.N.P.

Acantholipes maculifera**,** 1881 : lx. Holotype ♀: [Angola], Congo, Landana. In M.N.P.

Achaea oedipodina**,** 1879*b* : 140. Viette, 1954 : 384. Lectotype ♀: Madagascar, de Saint-Augustina à Tuléar (*A. Grandidier*, 1867), (coll. Mabille). In M.N.P.

Achaea orea**,** 1881 : lviii. LECTOTYPE ♂: Madag. [Madagascar]: ach. orea Mab. Madag. [Madagascar]: Achaea dejeani Boisd. not ezea Cram. [det. Hampson]: Achaea dejeani Bdv. = orea Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Paralectotype ♂: Madagascar: achaea orea Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Both in B.M. (N.H.).

Achaea sinistra**,** 1880*c* : xix. Holotype ♂: Madag. [Madagascar]: Achaea sinistra Mab. n.sp.: Achaea boris Geyer [Hampson det.]: Acheaa boris Gey. sinistra Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Achaea umbrigera**,** 1898 : 224. LECTOTYPE ♂: Maurice: achaea umbrifera [*sic*] Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Paralectotype ♀ with similar data labels. Both in B.M. (N.H.).

Acontia chloromelana**,** 1890 : 39. Holotype ♀: En mer Côte du Sénégal 14.vii.: ac. chloromelana Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M.(N.H.).

Acontia malgassica**,** 1881 : lx. Viette, 1954 : 384. Holotype ♀: Madagascar (coll. Mabille). In M.N.P.

Aconthia [*sic*] ***miegii*****,** 1882*a* : 134. Madagascar. Not found.

Acontia microcycla**,** 1879*a* : 94. Madagascar. Not found.

Acontia microptera**,** 1880 : 321. Viette, 1954 : 384. Lectotype ♀: Madagascar (coll. Mabille). In M.N.P.

Agrotis aethes**,** 1885 : 62. Holotype ♂: Santa Cruz, Patagonie (*Lebrun*). In M.N.P.

Agrotis aphe**,** 1885 : 61. LECTOTYPE ♀: Algeria: Agrotis aphe Mab. Paralectotype ♂: Algeria. Both in M.N.P.

Agrotis bicolor**,** 1885 : 59. Holotype ♀: Terre de Feu, B. orange (*Hyades & Hahn*). In M.N.P.

Agrotis carbonifera**,** 1885 : 60. LECTOTYPE ♂: Terre de Feu, Oushouaia (*Hyades & Hahn*). Paralectotype ♀: Terre de Feu, canal du Beagle (*Hyades & Hahn*). Both in M.N.P.

Agrotis consentanea, 1880*d* : cvii. Holotype ♂: Agrotis consentanea Mab. [Madagascar], Foulpointe: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3: Agrotidae genitalia slide No. 1851. In B.M. (N.H.).

Agrotis dianthaeciae, 1885 : 60. Holotype ♂: Santa Cruz, Patagonie (*Lebrun*). In M.N.P.

Agrotis digramma, 1885 : 60. Holotype ♂: Terre de Feu (*Hyades & Hahn*). In M.N.P.

Agrotis frigida, 1885 : 61. Holotype ♂: Terre de Feu, B. orange (*Hyades & Hahn*). In M.N.P.

Agrotis gravida, 1885 : 59. Holotype ♀: Terre de Feu (*Hyades & Hahn*). In M.N.P.

Agrotis ingoufii, 1885 : 59. Holotype ♀: Santa Cruz, Patagonie (*Lebrun*). In M.N.P.

Agrotis pudens, 1900 : 728. Holotype ♀: Comores: Agrotis pudens Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3: Noctuidae genitalia slide No. 3021. In B.M. (N.H.).

Agrotis rugifrons, 1888*a* : xlii. Holotype ♂ (without head): Tunisie, Gabés, 29.10.1885. In M.N.P.

Agrotis sabura, 1888*a* : xlii. Holotype ♂: Tunisie, Gabés, 29.10.1885. In M.N.P.

Agrotis typhlina, 1885 : 58. LECTOTYPE ♂: Terre de Feu, B. orange (*Hyades et Hahn*). Paralectotype ♀: same data. Both in M.N.P.

Agrotis xanthostola, 1885 : 61. Holotype ♂: Terre de Feu, B. orange (*Hyades & Hahn*). In M.N.P.

Alamis rufomixta, 1890 : 41. Holotype ♀: En mer—Côtes du Sénégal. 14.vii.: Alamis rufomixta Mb.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Ametropalpis nasuta, 1884*a* : clxxxix. Madagascar. Not found.

Anarta trisema, 1885 : 64. Holotype ♂: Terre de Feu (*Hyades et Hahn*). In M.N.P.

Ancistris saturnina, 1898 : 225. Madagascar. Not found.

Anophia oligomelas, 1890 : 43. Holotype ♀ (without abdomen): [W. Africa], A. oligomelas, Mb.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Anthophila heterogramma, 1881 : lxi. Congo. Not found.

Anthophila i-graecum, 1881 : lxi. Viette, 1954 : 384. Holotype ♀: Madagascar (coll. Mabille). In M.N.P.

Anthophila subolivalis, 1893 : 60. Viette, 1954 : 384. Lectotype ♂: Madagascar, Tamatave (coll. Joannis). In M.N.P.

Apamea lebruni, 1885 : 63. Holotype ♂: Santa Cruz, Patagonie (*Lebrun*). In M.N.P.

Arctia bicolor, 1879*b* : 137. (Now *Hypsiforma*: see Viette, 1954*a* : 13). Holotype ♀: bicolor Mb. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Athyrma saalmulleri, 1881 : lvii. LECTOTYPE ♀: [Madagascar]. Oph. noctuiformis Mab.: resemble à adjutrix Cr. 272 ex Surinam: Athyrma saalmulleri Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Athyrma trispila, 1890 : 45. Holotype ♀: Athyrma trispila Mab. [Ivory Coast], Assinie: Ath. trispila Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Axylia bucephalina, 1885 : 63. Holotype ♂: Santa Cruz, Patagonie (*Lebrun*). In M.N.P.

Bleptina tenebrosa, 1900 : 735. Holotype ♂: afr. c. [afrique centrale]: not in B.M. [det. Hampson]: Bleptina tenebrosa Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Bolina agrotidea, 1880 : 346. Holotype ♂: [Madagascar]. Bolina agrotidea P. Mab.: . . . Anophia Gn.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Botys monotretalis, 1880 : 339. Hamspon, 1910 : 468. LECTOTYPE ♀ (without body): [Madagascar] monotetralis Madag.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Bryophilopsis tarachoides, 1900 : 729. Viette, 1954 : 384. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys* 1898). In M.N.P.

Calophasia bicolor, 1889 : 153. Holotype ♂: Santa Cruz, Patagonie (*Lebrun*). In M.N.P. This specimen previously described as type of *Calophasia simplex*.

Calophasia simplex, 1885 : 64. Holotype ♂: Santa Cruz, Patagonie (*Lebrun*). In M.N.P. This specimen later redescribed as type of *Calophasia bicolor*.

Capnodes acrosema, 1900 : 734. Madagascar. Not found.

Caradrina hispanica, 1906 : 31, pl. 3 : 1. Holotype ♀: Espagne, La Granja, vii.1898 (*C. Dumont*). In M.N.P.

Catephia cazeti, 1893 : 59. Viette, 1954 : 384. Holotype ♂: Madagascar (coll. Joannis). In M.N.P.

Catephia melanis, 1890 : 43. Holotype ♀: [Ivory Coast, Assinie]. Cat. melanis Mab.: Voir Cocytodes maura Holl. in Hamps. v.xii. p. 261: Ex musaeo P. Mabille 1923: Ex. Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Catocola gitana, 1885 : 64. Holotype ♂: [Spain], Andalousie, Malaga. In M.N.P.

Coelophoris trilineata, 1900 : 733. Viette, 1954 : 384. Holotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys* 1898). In M.N.P. (Espèce type du genre).

Cucullia syrtana, 1888*a* : li. Holotype ♀: Tunisie, Gabès. In M.N.P.

Cyligramma amblyops, 1891*a* : xc. LECTOTYPE ♂: ♂: [W. Africa]. Cyl. amblyops Mab. type: Ex musaeo P. Mabille 1923: Ex. Oberthür Coll. Brit. Mus. 1927–3. Paralectotype ♀: ♀: [W. Africa]. Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Both in B.M. (N.H.).

Cyligramma concors, 1881 : lix. LECTOTYPE ♂: ♂: [Madagascar]. Concors Mab. ♂: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Paralectotype ♀: concors ♀: Cyligramma concors Mab. disturbans W. Madagasc.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Both in B.M. (N.H.).

Daphnaeura smithii, 1880*b* : clxxiv. Madagascar. Not found.

Daxata trisignata, 1900 : 734. Viette, 1954 : 384. Holotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Dianthaecia magellana, 1885 : 64. Holotype ♂: Santa Cruz, Patagonie (*Lebrun*). In M.N.P.

Diatenes merulina, 1890 : 42. LECTOTYPE ♂: Madag. [Madagascar]: Diat. merulina Mab.: Diatenes merulina Mab. Madag. [Madagascar]: = globulifer [det. Hampson]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Paralectotype ♂: Madag. [Madagascar]: D. merulina Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Both in B.M. (N.H.).

Earias crocea, 1900 : 727. Comoro Is. Not found.

Egnasia macularia, 1900 : 733. Holotype ♂ (without abdomen): Madag. [Madagascar] (not Maurice as recorded): Egnasia not in B.M. [det. Hampson]: Egnasia maculania (*sic*) Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Egnasia obscurata, 1898 : 226. Madagascar. Not found.

Epimecia quadrivirgula, 1888*a* : li. Holotype ♂: Tunisie, Gabès. In M.N.P.

Epimecia subtilis, 1888*a* : li. Holotype ♀: Tunisie, Gabès. In M.N.P.

Erastria acrochiona, 1900 : 729. Holotype ♀: Afr. or. [Afrique orientale]. In M.N.P.

Erastria apicimacula, 1880*c* : xviii. Viette, 1954 : 384. Lectotype ♂: Madagascar (coll. Mabille). In M.N.P.

Erastria leucoglene, 1880*c* : xviii. Viette, 1954 : 384. Lectotype ♀: Madagascar, Nossy-Bé (coll. Mabille). In M.N.P.

Erastria quadrimacula, 1900 : 729. LECTOTYPE ♂: [S. Africa]. Erastria 4 macula Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Paralectotype ♂: [S. Africa]. Erastria sp. not in B.M. [det. Hampson]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Both in B.M. (N.H.).

Euclidia remigina, 1884*a* : cxci. LECTOTYPE ♂: Madag. [Madagascar]: Euclidia remigioides Mab.: Remigiodes remigina Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Paralectotype ♂ (without body): Euclidia remigiodes Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Both in B.M. (N.H.).

Euperia nagaloa Mabille & Vuillot, 1890 : 8, pl. 1 : 7. Fiji. Not found.

Euplexia ochrargyra, 1900 : 727. Viette, 1954 : 385. Holotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Eurhipia rosea Mabille & Vuillot, 1890 : 6, pl. 1 : 4. Congo. Not found.

Eutelia gilvicolor, 1900 : 732. Holotype ♂ (without head): Afr. or. [Afrique orientale]: Eutelia not in B.M. [det. Hampson]: Eutelia gilvicolor Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Eutelia vulgaris, 1900 : 731. Holotype ♂ (without abdomen): [Mozambique], Delagoa: Eutelia sp. unnamed in B.M. [det. Hampson]: Eutelia vulgaris Mab. Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Exophila flexuaris, 1890 : 40. Holotype ♀ (without abdomen and hind wings): [W. Africa]. Exophila flexuaris Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Grammodes rhodotaenia, 1879*b* : 141. Holotype ♀: Madag. [Madagascar]: Gramm. rhodotaenia P. Mab.: Grammodes rhodotaenia Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Gyrtona erebenna, 1900 : 731. Holotype ♂ (wings from left side and abdomen missing): Madagascar, baie d'Antongil (*A. Mocquerys*, 1898): Gyrtona erebenna Mab.: 24: Ex musaeo P. Mabille 1923: Ex. Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Hadena inquinata, 1888*a* : xliii. Holotype ♀: Tunisie, Gabès, 29.10.1885. In M.N.P.

Hadena tetragona, 1885 : 63. Holotype ♂: Terre de Feu, canal du Beagle (*Hyades & Hahn*). In M.N.P.

Helia serralis, 1880*c* : xxi. Holotype ♀: Mad. [Madagascar]: Halia serralis Pierron Ste Maria: Halia serralis Madag [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Heliothis variabilis, 1890 : 39. Holotype ♂: Côte du Sénégal, 14.vii. In M.N.P. [Not a *Heliothis*, but a Quadrifine].

Herminia campanalis, 1880*d* : cviii. Holotype ♂ (without tip of abdomen): [Madagascar]. Herminia campanalis P. Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Herminia periplocalis, 1880*c* : xxi. Holotype ♂ (not ♀ as recorded): Hypena periplocalis Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

***Homoptera terrena*,** 1882 : 100. Viette, 1954 : 385. Holotype ♂: Madagascar (coll. Thierry-Mieg). In M.N.P.

Hoporina croceago Schiff. var. ***corsica*,** 1868 : 641. Corsica. Not found.

***Hydroecia hucherardi*,** 1907 : 37. France. Not found.

Hypaena [*sic*] ***gravalis*,** 1898 : 225. Holotype ♂: Maurice: Hypena not in B.M. [det. Hampson]: Hypena gravalis Mb. Ile Maurice: Hyp. gravalis Mab.: Ex musaeo P. Mabille 1923: Ex. Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

***Hypena albistriga*,** 1900 : 736. Holotype ♂ (without abdomen): Afric. or. [Afrique orientale]: Hypena not in B.M. [det. Hampson]: Hypena albistriga Mab. afr. or. [afrique orientale]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

***Hypena angulalis*,** 1880*c* : xx. Holotype ♂ (without abdomen): Hypena angulalis Pierron Ste Maria: Hypena angulalis Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

***Hypena contortalis*,** 1880*c* : 20. LECTOTYPE ♀ (not ♂ as recorded, and without abdomen): Madag. [Madagascar]: Hypena contortalis Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

***Hypena glyptalis*,** 1880*c* : xix. Holotype ♀: Hypena glyptalis Pierron Ste Maria: Hypena glyptalis Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

***Hypena hemigrammalis*,** 1880*c* : xx. Holotype ♂ (without hind wings and abdomen): Hypena hemigrammalis Mab.: Hypena hemigrammalis Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

***Hypena lyperalis*,** 1880*c* : xix. LECTOTYPE ♂: Madag. [Madagascar]: Hypena lyperalis Mb. Mad. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

***Hypena ophiusinalis*,** 1879*b* : 142. Holotype ♂: Hypena ophiusalis [*sic*] Mab. Madag. [Madagascar]: Hypena ophiusinalis P. Mad.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

***Hypopyra malgassica*,** 1879*a* : 93. LECTOTYPE ♀ (without abdomen): [Madagascar]. Hypopyra malgassica Mab.: Hyp. malgassica Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

***Hypopyra megalesia*,** 1880 : 346. LECTOTYPE ♂: [Madagascar]. Hypopyra megalesia P. Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Paralectotype ♀ (without abdomen): [Madagascar]. Resemble à H. grandaeva F.R. 115–11 M . . . : Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Both in B.M. (N.H.).

***Hypocala florens*,** 1880 : 324. Viette, 1954 : 385. Lectotype ♂: Madagascar, de Saint-Augustin à Tuléar (*A. Grandidier*, 1867). In M.N.P.

***Hypsa concinnula*,** 1879*a* : 85; 1879*c*: 294, pl. 6 : 2 (now *Mazuca*). Coast of E. Africa. Not found.

***Ilurgis subsignata*,** 1900 : 735. Madagascar. Not found.

***Liparis rhodophora*,** 1879*b* : 137. (Now *Melapera* **comb. n.**). LECTOTYPE ♂: Stilpnotia rhodophora Mab., Mad. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

***Madopa parallelalis*,** 1880*c* : xxi. Holotype ♀: Madopa parallelalis Mab. Madag. [Madagascar]: (twice). Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

***Marmorinia argyrographa*,** 1893 : 61. Viette, 1954 : 385. Holotype ♂: Madagascar (coll. Joannis). In M.N.P.

Metachrostis megalena, 1900 : 730. Holotype ♂: Afr. or. [Afrique orientale, not 'australe' as recorded]: Metachrostis sp. not in B.M. [det. Hampson]: Metachrostis megalena Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Metaptya sericina, 1900 : 730. Viette, 1954 : 385. Lectotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Micra lacteola, 1880*c* : xix. LECTOTYPE ♂: Mad. [Madagascar]: lacteola: Micra lacteola Mab. Mad. [Madagascar]: Negeta Wlk. luminosa Wlk. = micra lacteola Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Paralectotype ♀: Mad. [Madagascar]: Micra lacteola Mab.: Ex musaeo P. Mabille 1923: Ex. Oberthür Coll. Brit. Mus. 1927–3. Both in B.M. (N.H.).

Micra parva Hübner ab. ***rubefacta***, 1869 : 56. Holotype ♂: Corse. In M.N.P.

Micraeschus leptinia, 1900 : 731. Viette, 1954 : 385. Holotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Moma aequatoria, 1879*d* : 26. Mabille & Vuillot, 1890 : 6, pl. 1 : 3. Holotype ♀: [Congo]. Moma equatoria P. Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Naranga cyclina, 1900 : 730. Without locality; Madagascar or Africa. Not found.

Naranga nephelea, 1900 : 731. Holotype ♂: [Madagascar or Africa]. Naranga nephelea Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Noctua kermesina, 1869 : 55, pl. 2 : 10. Holotype ♂: Corse. In M.N.P.

Nodaria turpalis, 1900 : 735. Viette, 1954 : 385. Holotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Nonagria cyrnaea, 1867 : 559, pl. 8 : 7. Holotype ♂: Corse. In M.N.P.

Odontina pierronii, 1880*c* : xviii. Holotype ♂: [Madagascar]. Odontina pierronii Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Ophiodes minians, 1884*a* : cxc. Holotype ♂: Madag. [Madagascar]: Ophiodes minians Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Ophiodes orthogramma, 1879*b* : 140. LECTOTYPE ♂: [Madagascar]. Ophiodes orthogramma Mab.: Achaea orthogramma Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Paralectotype ♂: Ophiodes orthogramma P. Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Both in B.M. (N.H.).

Ophiodes pelor, 1881 : lvii. Holotype ♂: Ophiodes pelor P. Mab.: Achaea lienardi Boisd. Madag. [Madagascar], Anua pelor Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Ophiodes ponderosa, 1880 : 346. Holotype ♂ (not ♀ as recorded): Madagascar: Ophiodes ponderosa Mab. Madagascar, St. Marie 1879, Ex. D. Granbey: Ophisma trapezoides Gn. Madag., Anua coronata Fbr. = ponderosa Mab.: = coronota Fabr. [det. Hampson]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Ophisma leucochiton, 1884*a* : cxc. Holotype ♂: Madag. [Madagascar]: O. leucochiton Mab.: Ophiodes leucochiton Mab. Mad. [Madagascar]: Ophiusa allardi Ob. 1878, pl. 2, f. 6: Ophisma allardi Ob. O. leucochiton Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Ophisma saalmulleri, 1880 : 328. Holotype ♀: [Madagascar]. O. saalmulleri P.-Mab.: Syn de parallel d'après Hampson. Rapproche, dout . . . ♀: Dermaleipa parallelipeda Gn.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Ophisma varians, 1898 : 224. Zambèse and Conakry. Not found.

Ophiusa daedalea, 1879*a* : 93. LECTOTYPE ♀ (not ♂ as recorded): O. daedalea P. Mab. [Madagascar], Sta. Maria: = sypnoides Butl. ♀ [det. Hampson]: Serrodes daedalea P. Mab. synonymie maeandrica Slm. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Ophiusa digona, 1879*b* : 141. Viette, 1954 : 385. Lectotype ♂: Madagascar, de Saint-Augustin à Tuléar (*A. Grandidier* 1867) (coll. Mabille). In M.N.P.

Ophiusa nigrimacula, 1880 : 347. Viette, 1954 : 385. Lectotype ♂: Madagascar, de Saint-Augustin à Tuléar (*A. Grandidier* 1867). In M.N.P.

Ophiusa orthaea, 1890 : 44. Holotype ♂: Assin. [Ivory Coast, Assinie]: Ophiusa orthaea Mab. afr. occ. [afrique occidentale]: Ophiusa orthaea: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Ophiusa subangularis, 1890 : 46. Holotype ♂: [Comoro Is.], Mayotte: Ophiusa subangularis Mab. Mayotte [twice]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Orthosia ? arcifera, 1881 : lvi. Viette, 1954 : 385. Lectotype ♀: Madagascar (coll. Mabille). In M.N.P.

Orthosia mollis, 1885 : 62. Holotype ♂: Terre de Feu, canal du Beagle (*Hyades & Hahn*). In M.N.P.

Orthosia ochroglene, 1881 : lvi. Holotype ♀: [Madagascar]. Orth. ochroglene M.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Orthosia purilinea, 1885 : 62. Holotype ♀: Santa Cruz, Patagonie (*Lebrun*). In M.N.P.

Penicillaria pyrospila, 1893 : 60. Viette, 1954 : 385. Holotype ♂: Madagascar (coll. Joannis). In M.N.P.

Penicillaria subrubens, 1890 : 40. Holotype ♀: [Ivory Coast, Assinie]. Penicil. subrubens Mab. Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Phyllodes proetexatus, 1882*a* : 134, Viette, 1954 : 385. Holotype ♂: Madagascar (coll. Thierry-Mieg < coll. Brabant). In M.N.P.

Polydesma exarata, 1890 : 42. Holotype ♂: [Without locality: ? W. Africa]. Hom. exarata Mab.: = scandatula [det. Hampson]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Raparna confusa, 1900 : 734. Viette, 1954 : 385. Holotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Raparna didyma, 1900 : 734. Viette, 1954 : 386. Lectotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Rhanidophora enucleata, 1900 : 732. Holotype ♀ (without body) : Afr. mer. [Afrique meridionale, not occidentali as recorded]: Rhanidophora sp. unnamed in B.M. [det. Hampson]: Rhanidophora enucleata Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Sarothroceras alluaudi, 1889*a* : xcix; 1890 : 37. Holotype ♂: [Ivory Coast, Assinie]. Sarothroceras alluaudi Mab. Ex musaeo P. Mabille 1923: Sarothroceras alluaudi Mab. Ann. Soc. ent. France 1890, p. 37 [det. Oberthür]: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Sarrothripa virgulana, 1880*c* : xvii. Madagascar. Not found.

Scotosia syngrammata, 1880*c* : xxiv. (Now *Entomogramma* **comb. n.**) Holotype ♂: [Madagascar]. Scotosia syngrammata Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Selenis dimidiaria, 1893 : 61. Without locality. Not found.

Selenis semiscripta, 1893 : 61. Angola. Not found.

Serrodes leucocelis, 1880 : 330. Holotype ♀: Typicum specimen: [Madagascar] Ambaravan, Tamatave: Catephia (Serrodes) leucocelis Mab.: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Staga producta, 1900 : 735. Viette, 1954 : 386. Holotype ♂ (sans abdomen): Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P. (Espèce type du genre).

Stenopis reducta, 1880*d* : cviii. LECTOTYPE ♂: [Madagascar]. Stenopis reducta Mab. [twice]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Paralectotype ♂: Stenopis reducta Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Both in B.M. (N.H.).

Tarache acontina, 1900 : 729. Holotype ♀: Afr. c. [= Afrique centrale]. In M.N.P.

Tarache costosa, 1900 : 728. Holotype ♀: without locality [Madagascar or Africa]. In M.N.P.

Tarache decoripennis, 1900 : 728. E. Africa. Not found.

Tarache sublota, 1900 : 728. Viette, 1954 : 386. Holotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Thalpochares partita, 1880*c* : xviii. Viette, 1954 : 386. Holotype ♂: Madagascar, I. Sainte-Marie de Madagascar (coll. Mabille). In M.N.P.

Thalpochares trigrammos, 1881 : lxi. Holotype ♀: [Angola]. Congo, Landana. In M.N.P.

Thermesia anceps, 1879*b* : 142. Holotype ♀: [Madagascar]. Thermesia anceps P. Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Thermesia clarilinea, 1900 : 732. Viette, 1954 : 386. Holotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Thermesia junctilinea, 1900 : 732. Viette, 1954 : 386. Holotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Trigonodes hemidelta, 1890 : 46. Holotype ♂: Mozamb. [Mozambique]: Trigonodes hemidelta Mab.: = obstans Wlk. [det. Hampson]: Cuneisigna obstans Wlk. = hemidelta Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Xanthodes mariae, 1881 : lx. Viette, 1954 : 386. Lectotype ♂: Madagascar, Nossy-Bé (coll. Mabille). In M.N.P.

Xanthoptera coenogramma, 1900 : 730. Viette, 1954 : 386. Holotype ♀: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

Zethes humilis, 1900 : 733. Viette, 1954 : 386. Holotype ♂: Madagascar, baie d'Antongil (*A. Mocquerys*, 1898). In M.N.P.

AGARISTIDAE

Aegocera elegantula, 1893 : 56. Mabille & Vuillot, 1895 : 157, pl. 22 : 2. LECTOTYPE ♀: Verulam, Natal (*Spiller*): 299: M. elegantula Mab.: Cotype Mab.: 162. In Z.M.B.

Aegocera obliqua, 1893 : 56. Mabille & Vuillot, 1895 : 156, pl. 22 : 1. Holotype ♂: [W. Africa], Loko, 85, P. St. : 295: Ae. obliqua Mab.: 125. In Z.M.B.

Agarista distigma, 1898 : 219. Madagascar. Not found.

Agarista epipales, 1884*a* : clxxxix. LECTOTYPE ♂: A. epipales Mab. Madag. [Madagascar]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Eusemia deficiens, Mabille & Vuillot, 1892 : 53, pl. 8 : 4. Mabille, 1892*a* : clxxxiii. Holotype ♀ (without abdomen): Afr. oc. [Afrique occidentale], Xanthospilopteryx fatima Kirb.: X. deficiens Mab. afr. oc. [afrique occidentale]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Eusemia eoa, 1890*b* : cxxiii. Holotype ♀: afric. or. [afrique orientale]: Eusemia eoa Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Eusemia interniplaga, 1892*a* : clxxxiv. Holotype ♀: [W. Africa] interniplaga Mab. B.S. . . . 1891: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Eusemia (Xanthospilopteryx) melanochiton**,** 1892*a* : clxxxiv. Mabille & Vuillot, 1893 : 123, pl. 17 : 2. Holotype ♀: Kamerun int., Barombi-Station, 1889 (*Preuss*). In Z.M.B.

Eusemia metallica**,** 1879*a* : 88. Holotype ♂: [Congo] Eusemia metallica P. Mab.: Eusemia metallica Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Eusemia mozambica**,** 1890*b* : cxxiii. Holotype ♀: zangbar [Zanquebar, historically E. African sea-board]: mozambica Mab. ♀: Eusemia mozambica Mab., Mozambique: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Eusemia nigridorsa**,** 1890*b* : cxxiii. Holotype ♀: afr. oc. [afrique occidentale]: Eusemia nigridorsa ♀: Eusemia nigridorsa Mab., Guinea: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Eusemia novemmaculata**,** 1890*a* : 54. Holotype ♀: E. 9. maculata Mab. A.S. fr. 1890: Eusemia 9-maculata Mab.: Zangabr. [Zanquebar, historically E. African seaboard]: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Eusemia obryzos**,** 1879*a* : 89. Holotype ♀: Madag. [Madagascar]: Eusemia obryzos Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Eusemia triangularis**,** 1893 : 57. Mabille & Vuillot, 1895 : 158, pl. 22 : 3. LECTOTYPE ♂: Kamerun int., Barombi-Station, 1889 (*Preuss.*): 332: E. triangularis Mab.: 169: Type. Paralectotype ♂: Kamerun int., Barombi Station, 1890 (*Preuss*). Triangularis Mab.: Omphaloceps triangularis Mab.: Type. Paralectotype ♂: Kamer. int. Pr.: Type. All in Z.M.B.

Eusemia vectigera see Hypsidae.

Eusemia virguncula**,** 1879*b* : 136. Holotype ♂: Madagasc. [Madagascar]: Eusemia virguncula P. Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Eusemia xanthopyga**,** 1890*b* : cxxiv. LECTOTYPE ♂: xanthopyga Mab. ♂: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Paralectotype ♀: Afric. or. [Afrique orientale] Eusemia xanthopyga Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. Both in B.M. (N.H.).

Hypsa ambusta**,** 1881 : lv. Holotype ♀ (without head and abdomen): Hypsa ambusta Mab. Madag. [Madagascar]: Aganais ambusta Mab.: rare P.M.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

Phalaenoides alluaudi**,** 1898 : 219. Holotype ♀ (without abdomen): Madagasc. [Madagascar]: Phalaenoides alluaudi Mab.: Ex musaeo P. Mabille 1923: Ex Oberthür Coll. Brit. Mus. 1927–3. In B.M. (N.H.).

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